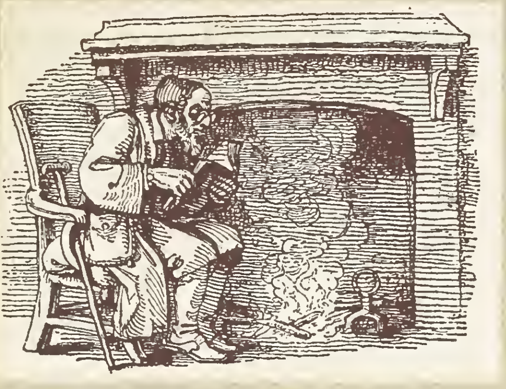

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MANUAL TRAINING MAGAZINE

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VOLUME XI NUMBER 1.

MANUAL TRAINING MAGAZINE

OCTOBER, 1909

VISITING MANUAL TRAINING SCHOOLS IN EUROPE.

I. IN LONDON.

Charles A. Bennett.

The series of articles of which this is the first records observations made during a nine-weeks visit among the manual training, art, and industrial schools of England, France, and Germany under the auspices of the National Civic Federation of America. Co-operating with the Civic Federation was the International Mercantile Marine Company and Alfred Mosely, Esq., of London, the organizer of the Industrial and Educational Commission and later of the visit of about two hundred English teachers to the United States and Canada. The author is especially indebted to each of the above for many courtesies and to Bradley Polytechnic Institute for a leave of absence, without which the visit would have been impossible.

IT is not given to every foreign traveler to reach Berlin in a drizzling rainstorm, Paris in the severest blizzard in eighteen years, and London in the worst fog in many seasons, but such was my fortune. I left Paris by the Calais-Dover route, crossed the Channel as quietly as I might have crossed a Minnesota lake on a summer afternoon, caught a glimpse of Dover Castle and the fortifications at the harbor entrance and then boarded a train for London with almost a home-coming feeling, because I knew it was again safe to address the porter in the English language.

As we approached London the trees and houses became less and less visible on account of fog, and the nearer we came the denser it grew.

It soon became impossible to see an object more than two or three arms length ahead of us. Detonators were placed on the tracks. The train would go until stopped by one of them, and wait a long time for a signal to start again. Then we would go on again at a snail's pace. So we continued until we reached Charing Cross Station.

I had always supposed that a London fog was much like an American fog except a little thicker, but such is not the case. You not only see it but you smell it, you taste it; the sounds you hear are muffled by it; like an evil spirit it follows you everywhere, even to your bedroom; and there it clouds your vision. In its appeal to the senses the London fog is like manual training—it is highly educative; it makes a deep impression upon you. Londoners have standardized fogs and numbered them as we used to number the degrees of hardness of rocks in the mineralogy class. The fog I saw was density No. 4 in a scale of five. I have no curiosity as to what No. 5 would be like. I saw enough London fog in three days to last a lifetime.

One of the officials in the education office of the London County Council takes particular delight in telling of a vivacious American schoolma'am who came into his office in November and almost wept because she had not seen a London fog. He was much amused for he could not understand why anyone would wish to see a London fog. But I am quite sure the good man would have been willing to have caused London to suffer a few hours, and would have ordered up a fog at once, had it been within his power to do so, such was the quality of the abundant hospitality of English school officials everywhere.

MY FIRST DAY IN LONDON.

It was on Thursday evening, January 28, that I reached London. I had scarcely settled myself in the hotel at Russell Square when I received a message from J. T. Baily, secretary of the National Association of Manual Training Teachers and a member of Mr. Mosely's committee, stating that he would meet me the next day and help me plan my itinerary. Promptly at 1:10 we met at St. Pancras Station and from that moment until I sailed from Southampton on the 3d of March, I was the constant recipient of courtesies initiated either officially or unofficially by the secretary of the National Association.

Fortunately for me, Mr. Baily had an appointment that afternoon with Sir John Cockburn, president of the National Association of Manual Training Teachers, and asked me if I would accompany him. Most certainly I would. We did not find him at his office, but a little later he caught sight of Mr Baily on the street, and hurried across to greet him and then to discuss matters relating to the Hull Conference of the Association to be held at Easter. Sir John impressed me very favorably from the moment I met him. He is a genial, warm-hearted, colonial Englishman with large business responsibilities and a broad outlook upon life, due in part, at least, to his education in science. Altho a very busy man, taking a prominent part in great public enterprises, he still finds time to make public addresses on education and to keep in personal touch with the representative manual training teachers of England. Possessing such remarkable energy, devotion to the cause, and winning personality, it is no wonder the manual training men say "We love Sir John."

Sir John Cockburn has been president of the National Association of manual training teachers since 1903. His predecessor for eleven years or more was Sir Philip Magnus, whose writings on manual training are well known to the older manual training men in America. The Association was formed in 1890 and has for its objects, (a) to desseminate the views of its members in respect to manual training; (b) "to watch the workings of Acts of Parliament and the respective minutes and circulars of the Board of Education and other educational authorities relative to manual training;" (c) to organize meetings and provide opportunites for the mutual exchange of experience and the consideration of matters affecting the professional interests of members; and (d) to take united action where such is necessary." When I discovered that the Association carries out its expressed purpose—that it is organized so as to bring influence to bear on Parliament or the Board of Education and even to secure justice to its individual members in case of trouble between a member and the school authorities—I began to realize how important it is that the Association have as its leader a man like Sir John Cockburn, and why it is that membership in the Association means so much to a manual training teacher. With its executive council, its branch organizations, its annual conference, and its official organ, *Manual Training,* it appears to be doing a large work, and in some of its departments a work quite different from that done in any of our American associations of manual training teachers.

After we left Sir John, Mr. Baily took me to the office of the London Teachers Association, where every American teacher receives a hearty welcome, and then to the office of the Education Department of the London County Council, where I received advice as to the schools I should visit and written permits to present to the head-masters. In the evening H. Williams Smith, editor of *Manual Training,* called at the hotel to welcome me to England. He seemed more like an old friend than a man whom I had never seen before. He invited me to go with him to the exhibit being held that evening at the Stanley Higher Elementary School and on the way we talked on many subjects of mutual interest. At this school I caught my first glimpse of English manual training work. Thus ended my first day in London.

During the next eleven days and the last five days before sailing for home I spent my time in London and places within easy reach by train. My chief aim during this time was to become acquainted with the manual training work in both the elementary and higher elementary schools, and as a secondary aim, to get acquainted with the work of a few typical industrial schools and schools of arts and crafts. Of course I spent some time in the museums, at St. Paul's Cathedral and Westminster Abbey, but I did not attempt to "see the sights" of London in the conventional way. It was more in harmony with my purpose to visit schools in operation and talk with the men who are influencing English education and the teachers who are meeting the every-day problems of the shop and classroom.

I shall never forget a morning call on Alfred Mosely. He was very busy, but not too busy to welcome another American teacher. I shall always remember his cordial greeting and his questions concerning Bradley Polytechnic Institute and its work. My brief interview with him was another proof of his deep interest in American schools, and recalled the origin of the Mosely commissions as told by Mr. Mosely himself. In his preface to the report of the 1903 commission he says:

> The story of the origin of the Industrial and Educational Commissions to the United States takes me back to South Africa some fifteen years ago. I had for many years been engaged in mining operations at Kimberley, which, in common with the work of the great bulk of the diamond diggers, had proved unremunerative, when Gardner Williams, the California engineer, arrived in South Africa, and took over the management of the De Beers Company, which the late Cecil Rhodes was just then amalgamating. Gardner Williams in turn imported the late Louis Seymour. To the latter, by the way, the British nation owes a debt of gratitude for his engineering work in Natal in the early stages of the recent Boer war. By repairing bridges as fast as they were destroyed by the enemy, and so keeping open the lines of communication without which operations in Natal would have been impossible, he and his volunteer company did yeoman service; and ultimately he lost his life whilst leading some of his men to cover in the defence of a bridge at Zand River. Gardner Williams and Louis Seymour were followed by many other American engineers, including Perkins, Jennings, and Hammond, the last two, it is interesting to note,

being graduates of Harvard University. Under the guidance of these able men and many others, the development of South Africa was started; and, in my opinion, her mining centers largely owe their primary success and subsequent prosperity to their efforts. Others from England and elsewhere have, of course, helped, but to Gardner Williams and Louis Seymour belongs the honor of being the first to put mining in South Africa on a sound basis, and to begin the building up of what is now one of the most important industries in the world, and certainly one of the richest heritages possessed by Great Britain. . .

The success of these engineers turned my attention to the United States, and some years ago I paid my first visit there for the purpose of seeing what sort of country it was that was responsible for sending so many level-headed men to the Cape. I spent some months in the country investigating, and was astounded at what I saw around me, not so much at the state of development that had been reached at that time as at what I discerned of the future. I felt that a country teeming with such natural resources must, in the hands of capable men thoroly acquainted with their business, play an important part in the future of the world, and was bound to exercise a far from negligible influence upon the industries of the United Kingdom. So far as I was able to ascertain, the form of education given in the United States is responsible for much of its success, and I returned home determined, if possible, to get together a party of experts to visit the country and test the soundness of my conclusions. I felt that not only must we investigate the educational system in vogue, but that workingmen, thru their trades unions, should also be given an opportunity of seeing at first hand what is being done on the other side of the Atlantic. Holding these opinions, I organized my two commissions, the work of which is now too well known to require any long description from myself. The great question which the industrial side had to answer was: "How is it that the United States can afford to pay half a dollar in wages where we pay a shilling, and yet compete with us in the markets of the world?

I left Mr. Mosely feeling that I had just met a man whose patriotism had outgrown, as it were, the bounds of his own country and had taken in the United States. His was no ordinary friendship. He wanted Americans to profit by a study of English schools just as he had profited by a study of American schools. He was conscious of excellencies and defects in education on both sides of the Atlantic, and he wanted to see the excellencies prevail on both sides. Certainly American teachers who were included in the Civic Federation visit are much indebted to Mr. Mosely.

A LONDON MANUAL TRAINING CENTER.

One cloudy morning I took a long 'bus ride to the Kennington Road Manual Training Center armed with my plate camera. I remember it was cloudy because I recall how one of the boys of the school brought a trestle for me to rest the camera on while I took a time exposure of the exterior of the building. Still I failed to get a very good picture. I present it to my readers, Fig. 1, because it shows a recent and fairly typical building. The London centers I saw were usually in the corner of a school yard, but often with a special entrance from the street. They are built of brick, have windows at both ends, and in order to get light as high up as possible, dormers or skylights, in addition to the ordinary windows on each side. The Kennington Road Center is unusual in that the building rests on an arcade. This is done in order to provide a rainy-day playground beneath. If you imagine the playground feature eliminated and the floor lowered about twelve feet you have a picture of a typical manual training center of which there are about 240 in London.

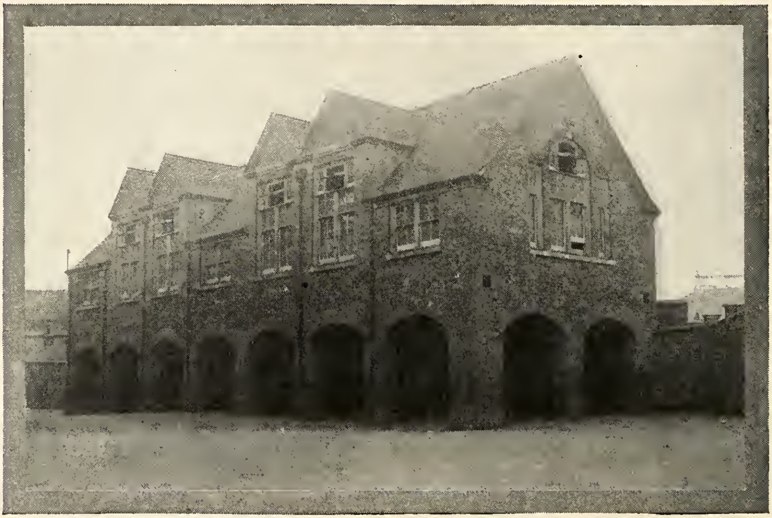


FIG. 1.—KENNINGTON ROAD MANUAL TRAINING CENTER, LONDON.

The interior is still more interesting, Fig. 2, with its ample light, its two rows of double benches, between which is a row of double tool racks, and its two rows of gas lights for evening work. The room accommodates forty pupils, and is under the direction of W. R. Goldsworthy, head teacher, and an assistant. There is a portable blackboard at each end of the room so that there need be no interference, if both teachers wish to give a demonstration at the same time. For most

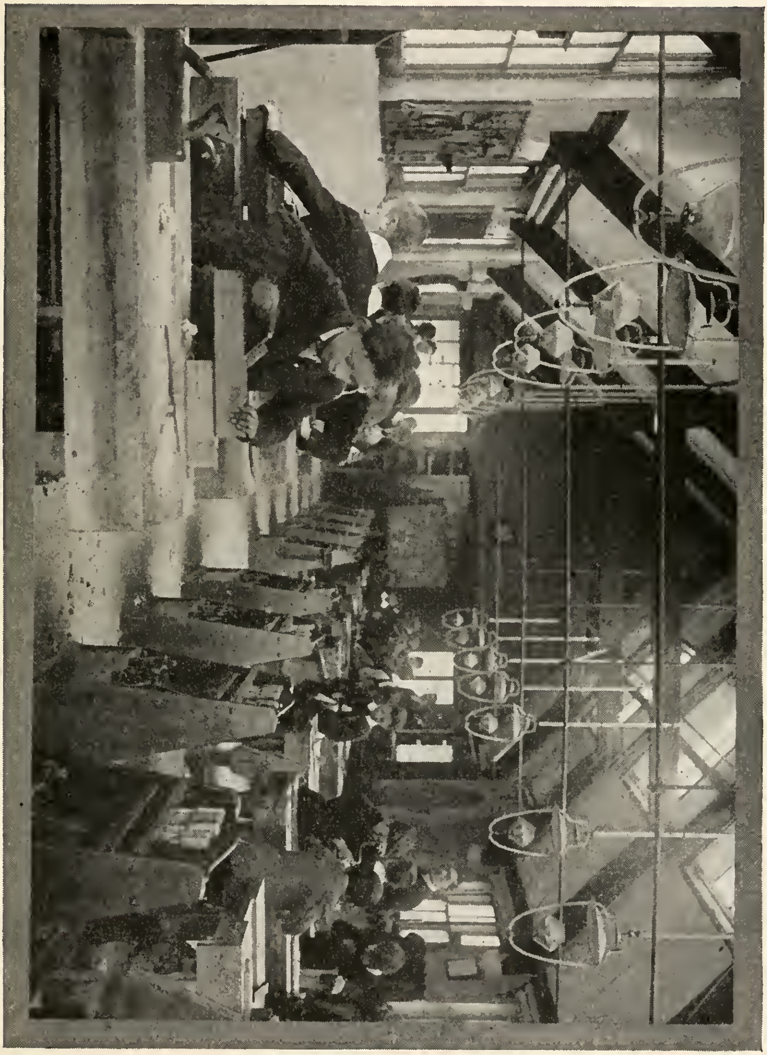


FIG. 2.—INTERIOR OF KENNINGTON ROAD CENTER.

purposes the class is divided into two sections of about equal size. Figure 3 shows Mr. Goldsworthy giving a demonstration to one of the sections. This grouping of the boys was not arranged for my special benefit, but I caught it in the regular course of the morning's work.

To this center come two classes every day. The first comes at nine in the morning and remains until twelve, with fifteen minutes recess. The second comes at two o'clock and remains till four-thirty, with a ten-minute recess. These are the hours thruout London except in a few special cases. There is no dividing up the day into four or five periods, nor is there any sending pupils from school to school in the middle of a session. The London plan enables the teacher to give a well-rounded lesson, covering both drawing and woodwork, to each boy once a week and makes it possible to teach two hundred boys. Four hundred boys go each week to a forty-pupil center where there are two teachers. No teacher gives instruction to more than two classes a day.

If you look again at Fig. 3, you will notice how small the boys seem and how even they are in size. I was impressed with these same facts in almost every manual training class I saw in England. I believe that the average boy of a given age in England is somewhat smaller than in America, but the evenness in size is due to a provision which seems to me to be a very wise one: Any boy in a Council school in London (excepting in a few schools where shops are not yet provided) who has reached the age of twelve years may take the shopwork whether he is up to grade in his other studies or not, and any boy in the sixth or seventh standard may take it if he is eleven years of age. Thus they avoid "the overgrown boy problem."

In London a child must leave the infant school at seven years of age. He then goes into the elementary school which has seven standards corresponding roughly to grades two to eight inclusive in American schools. It is illegal for him to remain in the elementary school beyond the school year in which he attains the age of fifteen. It may be unfortunate for some slow boys to be required to leave school at fifteen, but it is certainly of great advantage to many such boys to be allowed to take the full course in shopwork before they leave the elementary school.

I was so much interested in this provision that I began to figure out how it would work in certain American schools with which I am more or less well acquainted. I could picture the grade teacher objecting to having her boys picked out in that way for manual training

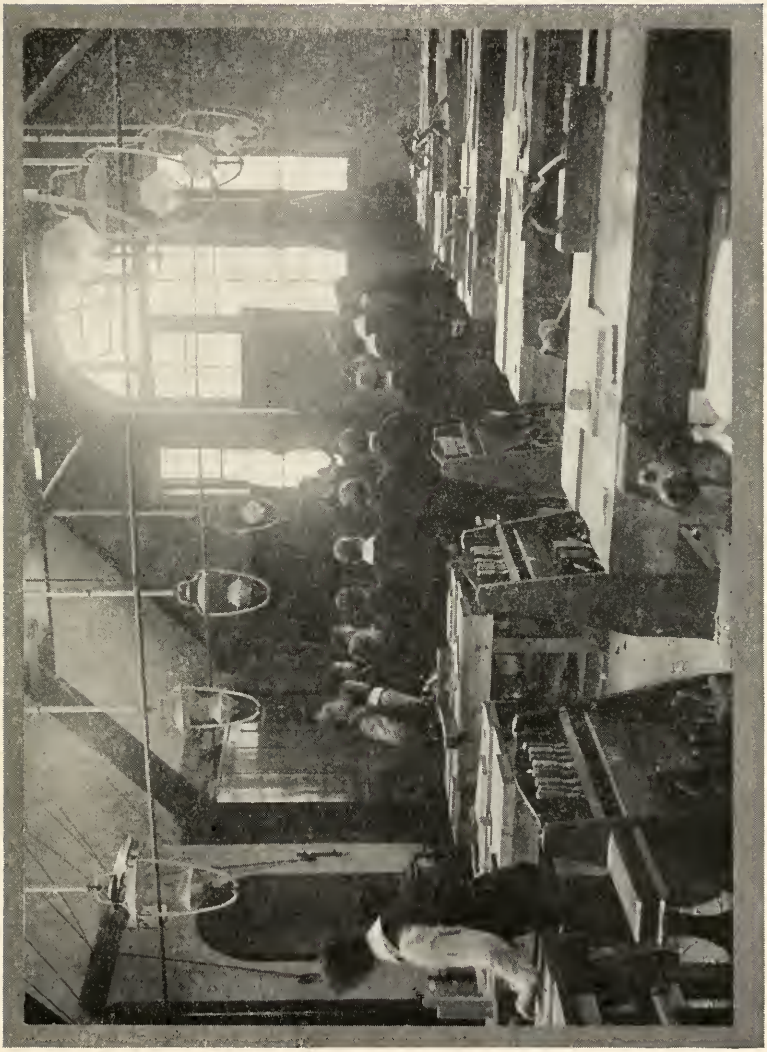


FIG. 3.—DEMONSTRATION LESSON IN KENNINGTON ROAD CENTER.

work, and so I asked one of the London teachers whether the grade teachers ever objected to their way of selecting boys. He seemed surprised at my question, and said that he thought they liked it. What he really said at first was that he thought they were glad to get rid of them. Then he pointed out that the boy did better work in his other studies for the hours spent in manual training. He seemed to think that this fact was recognized by many of the grade teachers.

The equipment of the Kennington Road School was especially interesting to me because, being one of the newest schools in London, it represented the most recent ideas of the inspectors. Mr. Goldsworthy seemed to take real pleasure in helping me all he could and removed one of the benches in order to allow me to photograph one of the floor tool-racks beside one of the wall tool cabinets where the tools for general use are kept, Fig. 4. The tools used are of good quality and quite similar in design to our American tools, except the planes. The Englishman has yet to be convinced of the superiority of an adjustable plane.

In each manual training center in London one is quite sure to see a board on the wall to which are fastened the models of the course of study in that center. Fig. 5 is the course in the Kennington Road School and to the layman would seem to be almost identical with that in every other center in the city. However, the teacher of manual training will readily discover slight differences, but these are, for the most part, within such narrow limits that they all represent substantially the same point of view. The course shown covers between two and three years of work. Ordinarily a boy takes three years of shopwork. The first six models are the same in all the centers. The regulation dated July, 1907, reads:

> Exercises I to VI must be carried out exactly as set forth in this memorandum. Should it be considered desirable to modify them in order to meet the requirements of dull boys in the lower standards, the approval of the Organizer must be obtained.

Concerning the later exercises the memorandum says:

> Exercises VII to XVI are given merely as indications of what would be considered part of a satisfactory course. Instructors are free to introduce more or less elaboration into their models according to their own taste and the ability of the class with which they are intrusted, provided that in the introduction of the successive tools and operations they follow generally the lines laid down in the present memorandum and in the scheme now in operation in the schools.

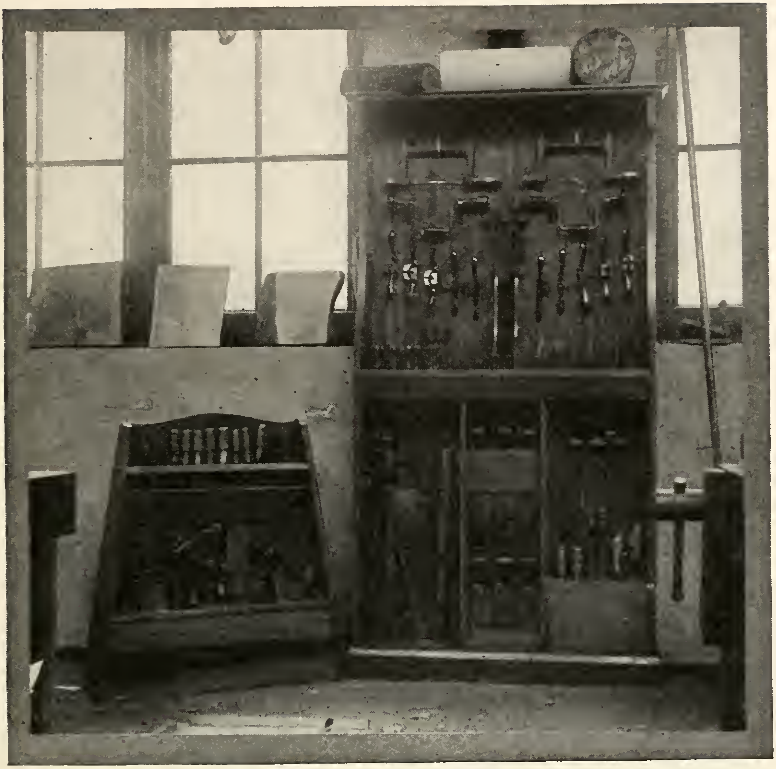


FIG. 4.—TOOL RACK AND TOOL CABINET, KENNINGTON ROAD CENTER.

The models of the elementary course, together with those of any advanced scheme of work, should, after the approval of the Organizer has been obtained, be prepared, numbered, mounted on a board and placed in a prominent position in the center.

Approved additional exercises should be numbered to correspond with the models to which they are alternate or supplementary, *e. g.,* 3 a, 7 a, and mounted on a spearate board.

The tolerant attitude toward flexibility in the course of instruction has begun to have some effect. In April, 1908, a circular on the making of apparatus for games and sports was issued by the Education Department. This gave working drawings of six models which may be made instead of exercises or models in the regular course. The circular names the conditions under which such work may be undertaken.

In looking over the memorandum of July, 1907, my attention was attracted by a few paragraphs on the use of the chisel. They brought

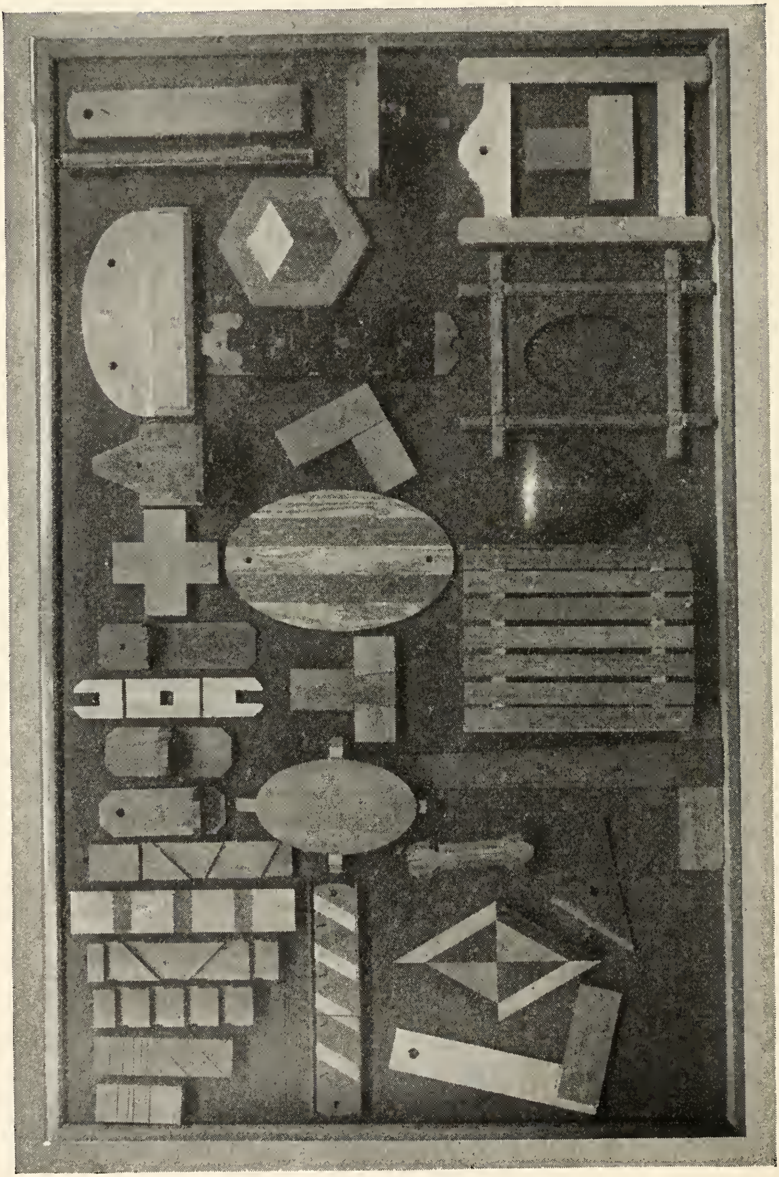


FIG. 5.—COURSE OF INSTRUCTION, KENNINGTON ROAD CENTER.

to my mind some experiences and discussions about the time Mr. Sickels' book was published advocating the use of the chisel as the first cutting tool in a course of instruction in woodworking. I recalled the severe criticism on his method and the result of the discussion. You can scarcely find a teacher in the United States today who uses a chisel before both the saw and plane and most teachers place it after both. It is evident that in London some cut fingers have added further proof to the contentions against Mr. Sickels' course. The paragraphs referred to are these:

> The Education Committee have lately had under consideration the question of the use of the chisel in connection with the scheme of manual training now in operation in the public elementary schools in London, and the following resolution has been adopted:
>
> > That the chisel should not be used as in the construction of Exercise I until the instructor has had an opportunity of showing each boy individually how the operation is to be conducted, and of standing over him for some time while he is thus using the chisel.
>
> In view of this decision it has been found necessary to modify the scheme of woodwork now in operation in the centers, the grooving or trenching exercise becoming third instead of the first exercise of the Scheme.[1]
>
> In order to carry out the instructions of the Committee it will be necessary in teaching the use of the chisel to call out the scholars three or four at a time whilst the first two exercises are in course of operation, and to allow each boy by himself and one at a time, to pare a groove in a prepared piece of material, the scholar having only to use the chisel. This operation must be performed under the direct supervision of the instructor, and after a careful preliminary demonstration first to the whole class and secondly to each group of three or four.

MR. BARTER'S POINT OF VIEW.

My introduction to the Kennington Road Center as well as to most of the other centers I visited in London was thru Solomon Barter, the Chief Inspector of Manual Training. In fact Mr. Barter personally conducted me to three of the centers, and gave me many helpful suggestions concerning others. I recall with special satisfaction these opportunities to get acquainted with the man who for over twenty years, has been fighting the battle for manual training in the largest city of the world. Many of my readers will recall that it was in 1887 that Mr. Barter and Charles Pearson started the work that has now grown to the point where there are about 60,000 boys taking shopwork in the manual training centers of London; and the work is still developing. We know that to bring all this about has meant hard pioneer work; it has also meant exceptional organizing power, persistent effort and a clearly defined purpose. It is always helpful to know the point of view of a man who has accomplished so much.

---

[1] See "Woodwork" by S. Barter.

One Saturday morning I met Mr. Barter by appointment at the Bonneville Road Center to see a class of "pupil teachers." As most of them were in the lecture room, Mr. Barter and I sat down for a good talk. At our previous meeting I had asked him several questions which perhaps led him to discuss his point of view. He began by saying that the Englishmen of today are not as hardy—not as able to do things as they were twenty years ago. This he believes is because they are softened by self-indulgence. The boy has his own way too much. He is not required to do as many hard things as he used to be. Mr. Barter believes that the salvation of the nation is in discipline. It is the best disciplined army that wins, the best disciplined navy that rules the seas, the best disciplined factory that competes—therefore the individual man must be disciplined if the nation is to be great. Mr. Barter illustrated his point by reference to the Japanese in the war with Russia, to the singer who learns to trill by long practice, and to a statement in Professor Poulson's recent book. He believes in rigid discipline. Moreover, he believes that work—real work which provides discipline—is naturally distasteful to a boy, and that the school must make him work till he forms the habit of working and so ultimately comes to like it. In America we would think Mr. Barter's treatment of boy nature unnecessarily heroic, but we have sometimes swung to the other extreme, letting the boy do just what he pleased whether it tended to form good habits or bad ones. If I was obliged to take one extreme I would most surely take Mr. Barter's.

After leaving the school Mr. Barter took me to his home at Clapham Common. There he showed me some of the most perfect pieces of craftsmanship in furniture that I have ever seen. A music cabinet, tables, china cabinet, sewing cabinet, sideboard, and others—all after Shearaton in style, most skilfully joined and richly ornamented with inlays of natural woods. Some of these were bewildering in their multiplicity of pieces but were so appropriate in their setting that they produced an effect of rare beauty. This furniture has all been designed and made by Mr. Barter at his own home in spare hours during the past sixteen years. Before he was a manual training teacher he was an expert cabinet maker, a designer and shop manager. He has done choice cabinet work for English customers and at one time had to do with fitting up an interior for the Czar of Russia. Is it any wonder that careless and sloppy work is offensive to Mr. Barter? Surely a man with such skill and training must insist on good technic. More than once Mr. Barter said to me, "My point of view is that of an artist and disciplinarian."

THE TRAINING OF MANUAL TRAINING TEACHERS.

As I said a few moments ago I went to the Bonneville Road Center to see the work with a class of teachers. When I reached the workshop I found H. T. Owen who was at one time in Canada, but is now in charge of a center in London. He was taking the place of the regular teacher who was absent on account of illness. I found Mr. Owen busily at work correcting drawings that had been brought in by the students in training to become teachers of manual training. The drawings were memory outline drawings of tools—a brace, an auger-bit, center-bit, screwdriver, etc. These are given because a teacher needs to be able to draw diagrams of tools on the blackboard and because such drawings are required in the examinations for which these men are preparing. The drawings were part freehand and part mechanical and were being corrected in red ink. Every detail of form and every convention of representation was carefully scrutinized. For instance, the thread of the spur of the auger-bit was made left-handed by one student and was corrected by means of a small drawing in red ink beside the corresponding part made by the student.

Only two men were at work in the shop that morning and I learned that these were teachers in the elementary schools, and therefore in need of more shopwork, while a large majority of the men in the class were mechanics who needed more time in theoretical work. This was given in an adjoining school building by J. Boorman from the Shoreditch Technical School. In all there were twenty-seven students in the class.

In order to make clear what was being done in this class it should be stated that the woodworking and metalworking teachers for the London County Council schools are supplied from two sources: (a) from the pupil teachers' classes at the Shoredich Technical School, which at present turns out about ten teachers a year, and (b) from the Saturday classes of teachers and mechanics. But completing the outlined course in either of these does not make the man a certified teacher. There are but two institutions in all England whose certificates to manual training teachers are recognized by the Board of Education; namely, the City and Guilds of London Institute and the Educational Handwork Association. Whether the person preparing to teach lives in London or in the North or even in one of the colonies, he needs a certificate from one of these institutions. Consequently examinations are conducted at stated times in different parts of Great Britain. The students I saw at the Bonneville Road Center were preparing for the City and Guilds of London Institute examination. The teachers from the elementary schools whom I saw at work in the shop would have to pass first-year examinations in (a) woodworking and (b) drawing, and a year later the final examinations in (a) woodworking, (b) drawing and (c) the technology of the subject, the equipment of the manual training room, methods of teaching woodworking, and class management. The young mechanics, who composed a large majority of the class, would have to take a "literary test" in addition to the above. The requirements for admission to these Saturday classes also vary. In the one case it is an elementary school teacher's certificate or certificate from a headmaster of a secondary school stating that the candidate is a competent teacher; in the other case it is evidence that the candidate has passed one of the Institute's examinations in pattern-making, carpentry and joinery, ship-builders' work, cabinet-making, carriage building, or wheelwrights' work. The aim of the Saturday classes is therefore to supply the various deficiencies and bring the men up to such a standard on both the theoretical and practical sides that they can pass rigid examinations. What I have said has referred to the preparation of wood-

FIG. 6.—SHOREDITCH TECHNICAL SCHOOL, LONDON.

working teachers, but the plan is similar for teachers of metalworking.

In order to get a clearer idea of the details of the preparation of teachers I spent part of a day at the Shoreditch Technical School, Fig. 6, where it is stated the course for manual training teachers is the most complete in the Kingdom. There I again met Mr. Boorman who gives special attention to the courses for teachers. The course covers four years above Standard VII, or approximately the four years corresponding to our high school. Many of the courses were the same as those taken by the day students preparing to become skilled workers in the cabinet and builders trades. There were about forty students in the "pupil teachers classes."

I was permitted to copy the schedule of courses which is as follows:

HOURS PER WEEK

YEAR	I	II	III	IV
English	5	5	4	4
Mathematics	4	4	4	4
Art	6	6	2½	2½
Woodwork	10	10	6	6
Metalwork	0	0	3	3
Teaching	0	0	9	9
Geometry	1½	1½	0	0
Cardboard Work	2	2	0	0
Machine Drawing	0	0	½	½

The "art" includes drawing, modeling, plaster casting from clay models, and wood-carving. It also includes building construction, trusses, furniture drawing, and design for inlays, carving, and metalwork—hinges, escutcheons, pulls and the like. During the first year three hours a week are given to clay modeling and carving. Among the modeling problems I noticed designs for metal plates, and interlaced band designs for corners of frames to be carved in wood in low relief. The metalworking of the course consists of making hinges, pulls, etc.,—fixtures for furniture—also tool-making. The cardboard work reminded me of the first part of the Leipsig course by Dr. Pabst. The practice teaching is done both in this school and in the manual training centers of the city. The daily sessions of the school are from 9:30 to 12:30 and from 1:30 to 4:30.

I was fortunate in being shown thru the building by Percy A. Wells, the chief technical instructor, who is an expert in furniture de-

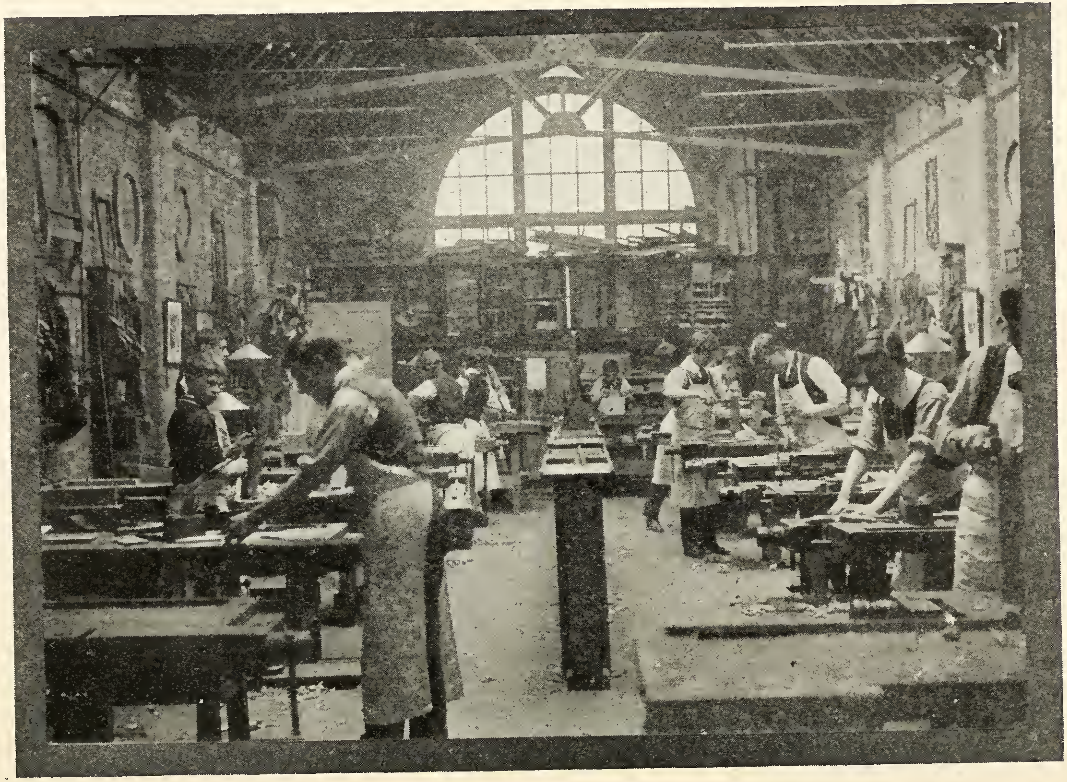


FIG. 7.—WOODWORKING SHOP, SHOREDITCH TECHNICAL SCHOOL.

sign and construction. Certain characteristics of the work in furniture making especially interested me. For example, the plan of procedure with certain problems was as follows:

(a) The student makes a sketch to scale of the object he is to construct. This is in a measure his own design. The size of the object and the form of construction are given by the teacher. This practically amounts to what we would call a type form of given dimensions. Then the pupil chooses or designs the contour of certain parts, as the top of a book-rack or the moulding for a cap or base. He also determines the decoration—inlay or carving—and selects the kind of wood.

(b) After this has been done he makes a full-size working drawing. I noticed that all working drawings for furniture were made full size as in practice in the shops. To economize paper and for convenience, the vertical section is made in blue pencil on the front elevation, which is in black pencil. The plan or the horizontal section is made in red pencil and this also is placed on the front elevation. Thus all blue parts belong to vertical and all red to horizontal views perpendicular to the plane of the front view.

(c) The third step was to make a cutting list of material (number of pieces, for what, length, breadth, thickness, etc.), and then construct the object in the shop.

(d) Finally a cost sheet was prepared. This and the cutting list were attached to the sketch.

Among the problems being worked out in this way were a combined book-rack and stationery case involving drawer construction as the principal feature. Another problem which Mr. Wells considered his most important was a cabinet with plinth at the bottom and a cap (with dovetails at back corners) at the top. This problem is worked out in new proportions each year—sometimes with one door, sometimes with two; sometimes with drawer at top or at bottom or both; but always with the three elements, plinth, body, cap.

The note-books on woodworking kept by the pupil teachers were very neat and thoroly done. They contained sketches, and notes on lectures, covering tools, joints, economy in the cutting of timber, selecting timber, technical terms, etc. These books were about the size of composition books—say 8¼ x 6 in. The lettering in the books was noticeably good, being plain hair line Gothic.

Many photographs of fine inlays, carvings, and metal fixtures in the South Kensington Museum were almost constantly in use in the

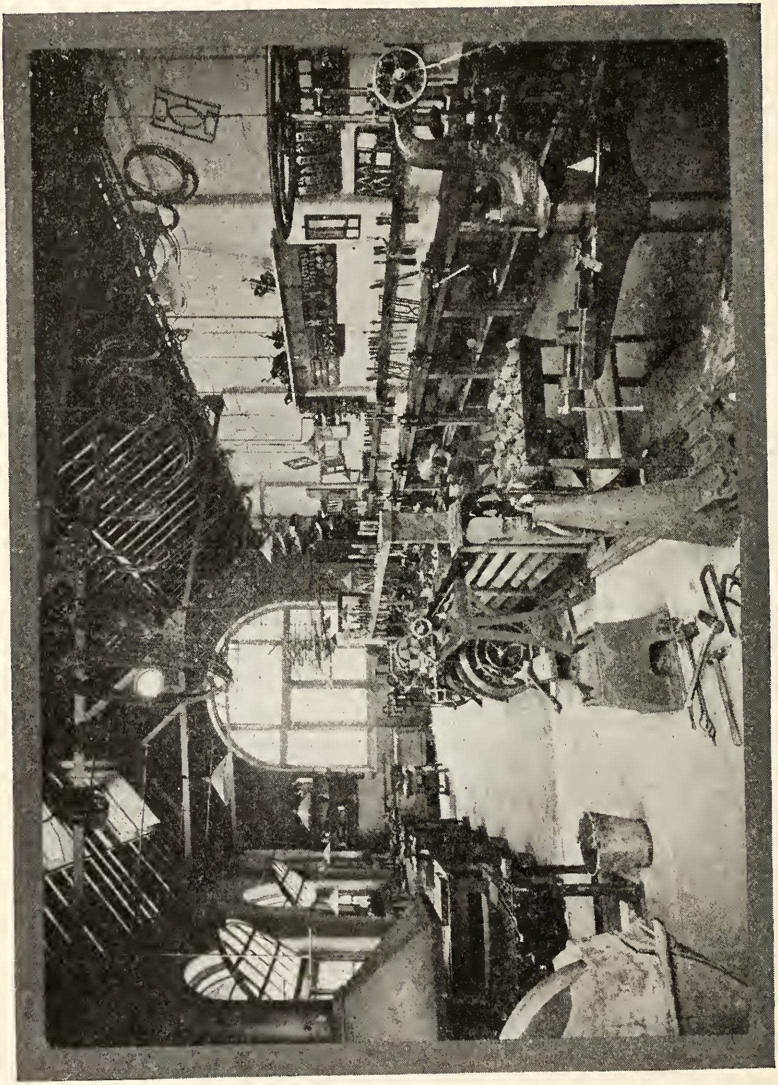


FIG. 8.—METALWORKING SHOP, SHOREDITCH TECHNICAL SCHOOL.

classes to illustrate good design. Mr. Wells thinks highly of inlaying as a simple means of decoration in furniture and seems to find it thoroly practical. I asked him if the pupils made all their own inlays and he replied that they did not. Some, such as built up borders, are purchased ready to set in place. In this respect he is doing in this technical school just what the manufacturer of furniture does.

I asked Mr. Barter from which of the two sources above mentioned he was able to obtain the best teachers. He seemed to think that on the whole those coming from the Shoreditch Technical School were better than those from the Saturday classes, but there were notable individual exceptions.

The interiors of two of the principal shops are shown in Figs. 7 and 8. I was interested in the metalworking equipment, but was surprised to see that it was so badly arranged with reference to light at the individual working places.

Before I left the school I visited the girls' department where I found the drawing very closely related to the dressmaking and upholstery. The teacher of dressmaking, when teaching the designing of a costume, required the pupils to make patterns of the parts to be decorated. These were then taken to the art class where the needlework decoration was designed. In the work of the upholstery classes, art is a still larger factor.

HIGHER ELEMENTARY SCHOOLS.

In addition to the ordinary elementary schools which supply the normal type of education, the London County Council has organized fifty-two higher schools which provide a more advanced elementary education for specially selected pupils. These are uniformly distributed thruout the city and accommodate approximately 27,500 pupils. The pupils are selected from the contributory schools by the district inspector, with the advice or recommendation of the head masters and head mistresses. This selection is made not merely with reference to school examination results but also with the special purpose in view of developing each pupil in the direction of his greatest ability. In fact the probable future career of the pupil is held in mind when the selection is made. The pupils enter these schools at about twelve years of age and remain three or four years. The curriculum varies according to locality. In some cases it has an industrial bias, in others a commercial and in still others it is of a general nature.

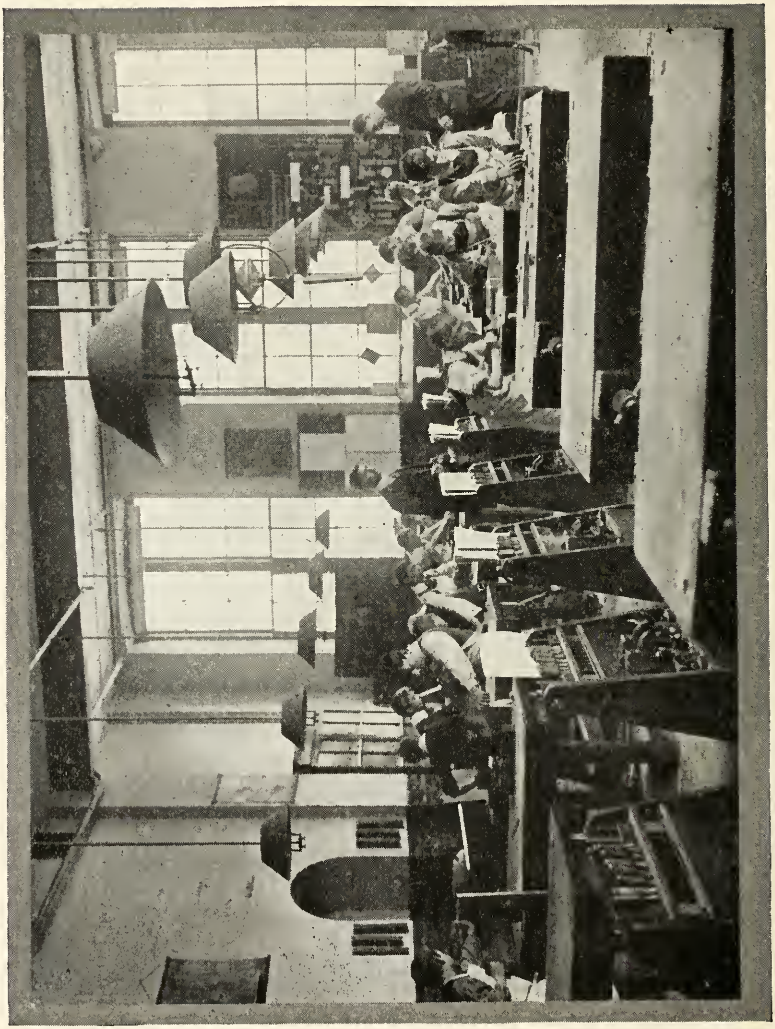


FIG. 9.—WOODWORKING ROOM, STANLEY HIGHER ELEMENTARY SCHOOL.

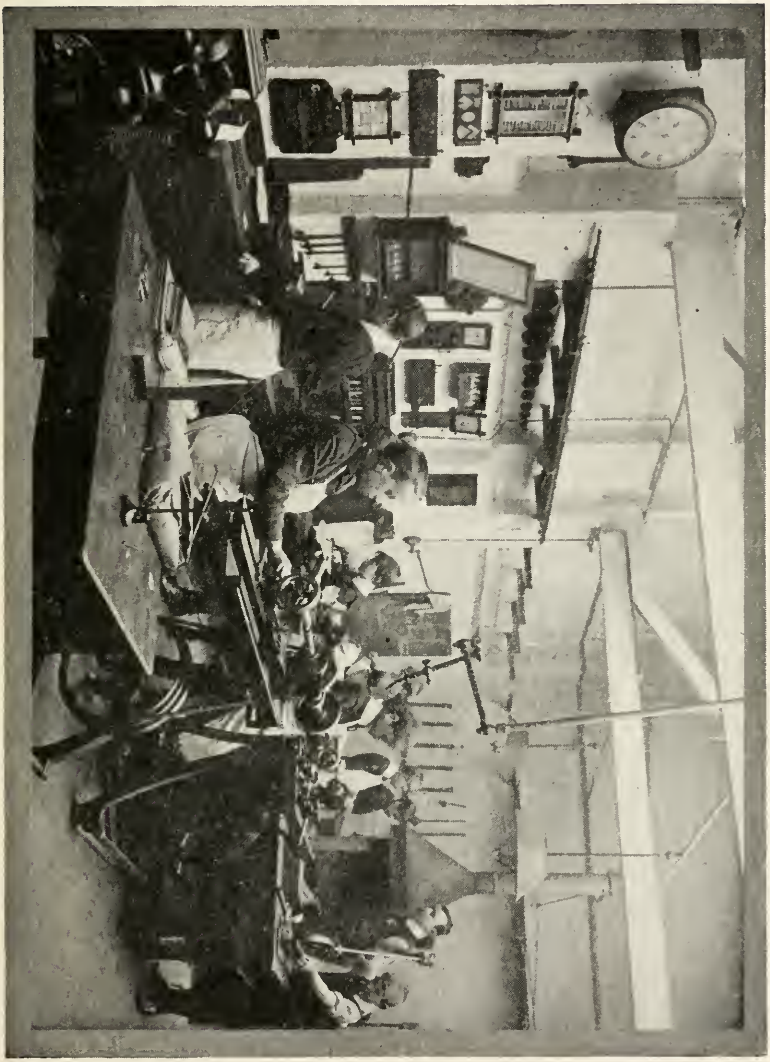


FIG. 10.—METALWORKING ROOM, STANLEY HIGHER ELEMENTARY SCHOOL.

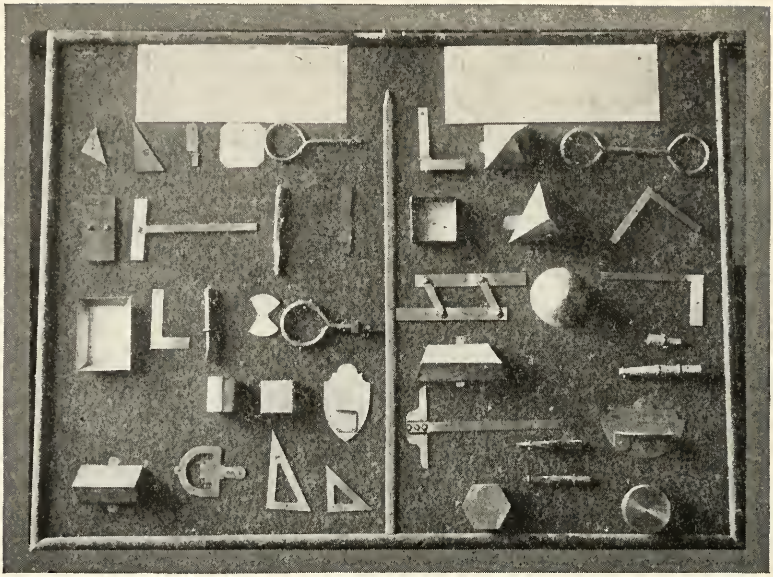


FIG. 11.—FIRST AND SECOND YEAR COURSES IN METALWORKING, STANLEY HIGHER ELEMENTARY SCHOOL.

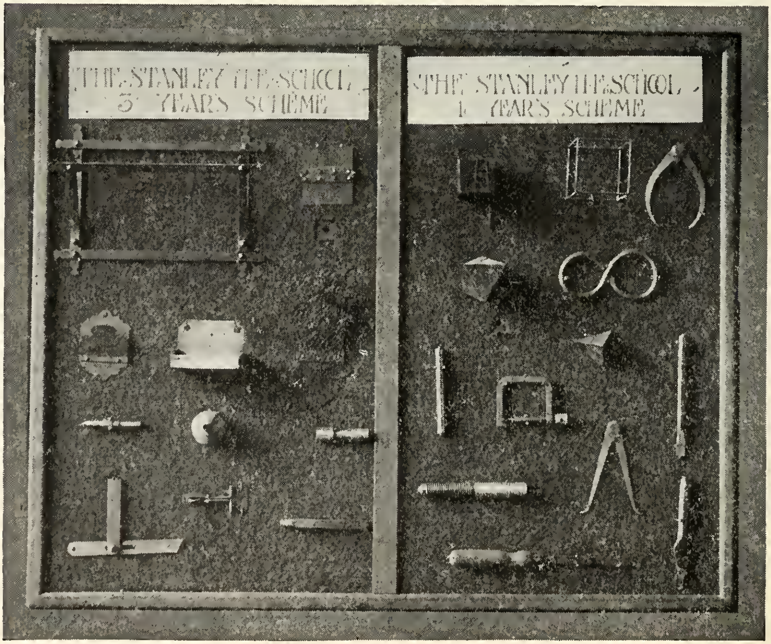

THE STANLEY H.E. SCHOOL
3 YEARS SCHEME
THE STANLEY H.E. SCHOOL
4 YEARS SCHEME

FIG. 12.—THIRD AND FOURTH YEAR COURSES IN METALWORKING, STANLEY HIGHER ELEMENTARY SCHOOL.

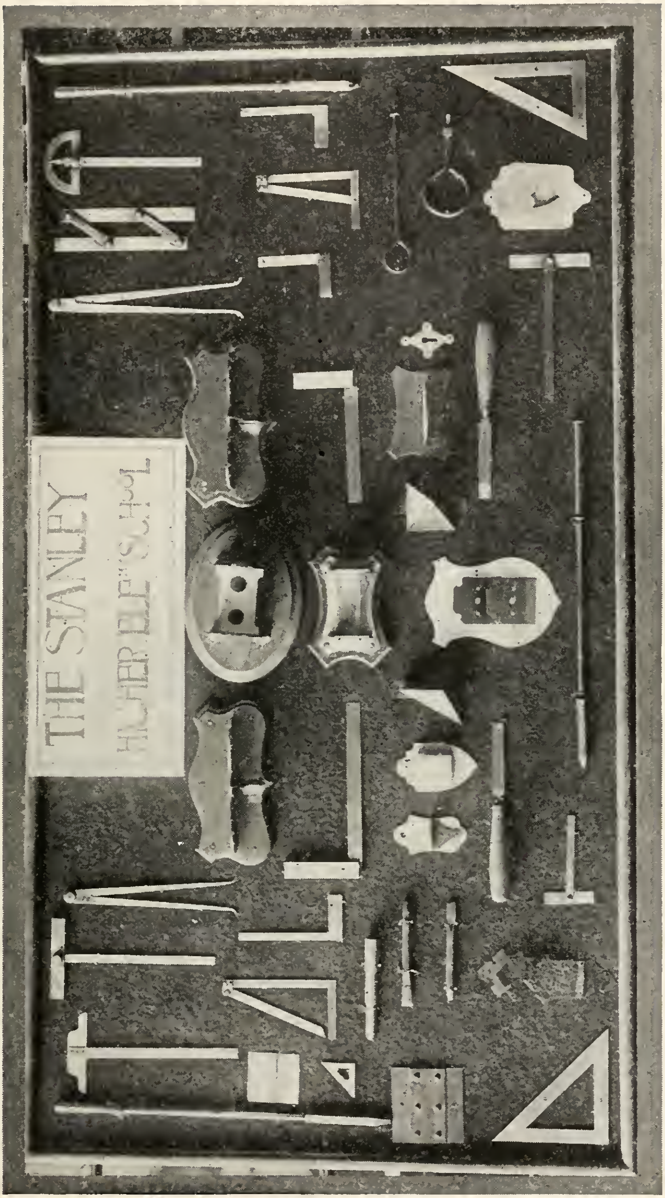

THE STANLEY
HIGHER ELE'Y SCHOOL

FIG. 13.—SUPPLEMENTARY MODELS IN METALWORKING, STANLEY HIGHER ELEMENTARY SCHOOL.

Just at this time when we in America are having so much discussion over the work of the upper grammar grades on account of the demands of industrial education, these higher elementary schools are in some respects suggestive. It was therefore with keen interest that on two occasions I visited the Stanley Higher Elementary School, at St. Pancras. Thru the head master, Walter Smith, I was given every possible opportunity to study the work of the school and to take photographs.

The course of instruction in this school consists of

(a) English subjects, including geography and history.

(b) Mathematics, including arithmetic, algebra, mensuration,, and elementary trigonometry. Mathematics is treated experimentally and is made very practical. It includes construction work, geometric drawing and many applications to practical life.

(c) Science, covering elementary physics and chemistry—theoretical and practical. The laboratory work is given emphasis.

(d) Art, including freehand model drawing, light and shade, brush drawing and design.

(e) Manual training, including both woodwork and metalwork and the drawing that goes with them.

(f) Physical training.

All subjects are correlated as far as practicable but care is taken not to sacrifice the essentials of any subject in the effort to correlate it with others. Mathematics occupies a most important, if not the central place in the curriculum of this school, and its influence is strong upon the other subjects—notably upon physics, drawing and shopwork. I was much pleased with the fine spirit and systematic work being done in the woodworking shop, Fig. 9, the course of instruction in which was similar to that at the Kennington Road Center; but the metalworking shop, Fig. 10, interested me most because the work here covers a field which I am confident has received too little attention in the United States. I begged the privilege of taking pictures of the models in the course of study, and so am able to present to my readers the scheme by years, Figs. 11 and 12, and a board of supplementary models, Fig. 13. At the Shoreditch Technical School, which is fundamentally a school to fit boys for the furniture trades, most of the metalwork finds its application in furniture. Here at the Stanley School the work covers a wider field of application—is in fact a manual training course.

(*To be continued.*)

THE NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

JAMES PARTON HANEY.
Sometime Secretary of the National Society.

DR. HENRY S. PRITCHETT, first president of the National Society, has summed in trenchant phrase the reason for its being. "In this day," says he, "every nation must make of each citizen an effective economic unit, and then must bring these units into efficient organization. We in America are not doing this. We are behind, and as an old Methodist belief holds that the first step to improvement is a conviction of sin, so the first purpose of this Society is to make it clear to the American people that we are behind; that we are not preparing our men and women as they must be prepared to be effective economic units." Possessed of the conviction thus expressed, a small group of men gathered at the instance of Professor Charles R. Richards and the writer at the Engineers' Club in New York City in the spring of 1906. Plans were then discussed looking to a union of the forces making for industrial education the country over. It was recognized that the problems presented involved not only questions educational and economic but social considerations of grave importance. Many diverse points of view were at once presented and it was recognized that while there was undoubtedly a strong need for a national organization to promote industrial education, such a society could not succeed unless it offered equal opportunity to employer and employee, to social student and to schoolman, to discuss questions vitally concerned with the welfare of each. Above all there appeared the necessity of arousing in the public mind the importance of early action, for it was seen that in last analysis the success of measures requiring the establishment of industrial schools could only prevail when the people at large were thoroly alive to the necessity of taxing themselves for this new form of public instruction.

Following the meeting of the committee on organization, an active campaign was undertaken thru the succeeding months to draw into line community representatives of the various groups most concerned in the movement. Early in November of 1906 a permanent organization was effected in a general meeting called at Cooper Union in New York

City. At this meeting there were present some two hundred and fifty persons among whom were prominent business men and educators from all the larger cities in the east and from Chicago, Cincinnati, Milwaukee and other cities of the west and south. A constitution was then adopted and a board of officers was elected with Dr. Henry S. Pritchett as president. On the evening of the same day a general meeting was held in the assembly hall of Cooper Union, presided over by President Nicholas Murray Butler of Columbia University. This meeting was addressed by Mr. Milton P. Higgins who had been chairman of the original committee on organization and by a distinguished group of speakers including Mr. Vanderlip of the National City Bank, Mr. Fish, president of the American Telephone and Telegraph Co., and Miss Jane Addams of Hull House. There also spoke Mr. Samuel B. Donnelly who, as secretary of the general arbitration board of the New York building trades, appeared as a representative of organized labor. His address was a strong commendation of the plans of the new organization. In concluding it he said: "Industrial education will be greatly beneficial to the individual and the state if it reduces the term of apprenticeship and aids the individual in increasing his capacity as a producer and wage earner. . . . I understand that the objects of this society have been approved by the largest trades unions of the country. Its objects are the promotion of industrial education, in order that the quality of the product of American industries may be improved, that the earning capacity of the mechanic may be increased, that the need for highly skilled all-round mechanics may be supplied, and I wish it the greatest measure of success."

The first efforts of the new organization were directed toward a development of state committees thruout the union and a sounding of sentiment on the part of employer and wage earner. The press had given generous space to the proceedings of the organization meeting and inquiries soon poured in upon the secretary, Professor Richards, for information relative to the literature of industrial education in this country and abroad. In response to these the secretary prepared a bibliography of industrial education which shortly followed the proceedings of the organization meeting as the second bulletin of the society. A number of committees for the special study of industrial problems were at once organized while it was left to the writer to secure from manufacturers and representatives of organized labor opinions as to the desirability of fostering industrial education and as to the forms which those consulted were prepared to recommend. The result of this inquiry was published in the form of a symposium as "bulletin number three." The responses received were strikingly uniform in their emphasis as to the necessity for trade training. While the means to be adopted varied with the experience and point of view of the writer, employer and employee with but few exceptions united in urging the development of industrial education on the broadest lines. In the words of Henry Abrahams, secretary of the Central Labor Union, Boston, Mass., "The trade school is coming, hence we must recognize the inevitable. After the child has arrived at fourteen years of age there should be a public institute of technology where every pupil could enter free, with no charge for tuition or books or laboratory work; also arrangements where boys who desire could enter some manufacturing concern and be taught a trade, not part of a trade. The trade school is only a legitimate outgrowth of the present public system and is a just charge upon the public."

Following the publication of the symposium above referred to, the society issued an extended study of industrial education for women. This was prepared by Miss Florence M. Marshall of the Boston Trade School for Girls, and stands in its analysis and practical suggestions as one of the most important contributions in the special literature of this subject.

While one branch of the national organization was thus busy in developing special studies of the subject, another under the energetic leadership of the vice-president, Mr. M. W. Alexander, was extending its propaganda in a great circle of states. At the close of 1907, thirty-eight of these state committees had been organized, each composed of representatives of various lines of activity, it being the aim as far as possible to represent in each committee, the interests of employer and employee, of the educator, and the general public. It is worthy of note that altho practically all invitations to serve on these committees were undertaken by correspondence, prominent men and women everywhere readily responded to the call. Some of these committees immediately devoted themselves to their work of arousing and crystallizing public opinion in favor of industrial education for the boys and girls of their communities, while others brought pressure upon their respective legislatures to secure state aid in the movement. The New Jersey committee assisted in the initiation and passage of a bill creating a state commission for the study of the industrial educational needs of the state and for the development of recommendations which might lead to the establishment of schools for industrial training. The influence of the Wisconsin committee aided materially in the development of a law which now makes it possible for cities in that state to establish public trade schools, while the Ohio committee made an extensive investigation of the opportunities for industrial training thru apprenticeship, trade schools and classes under various auspices.

In order that the members of the various state committees might profit thru discussion of their respective projects, a meeting of delegates from the committees was called at the same time that the first annual meeting was held in Chicago on January 23, 1908. Delegates from seventeen state committees took part in the meeting and after reports from the different states, united in the passage of two resolutions. The first called for the appointment of a commissioner or field officer who might be able to devote his entire time to the society's propaganda and to the development of state organizations. The second recommended the conversion of the state committees into state branches of the national society. These branches it was suggested might be incorporated under state laws and thus secure important standing and influence in the development of industrial education thru legislative action.

Pursuant to the second resolution the executive committee of the national society in March, 1908, adopted a set of by-laws for the government of state branches. These required each branch to have a membership of at least fifty and provided that of the dues paid by each member of a branch one-half should be returned by the national society to the branch itself. Ultimately it is the expectation that the national society will consist entirely of an affiliation of state organizations, each of which will undertake the development of the society's propaganda within the boundaries of its state. The home office will stand as a central bureau of information with facilities for collating and publishing a large amount of material dealing with industrial education.

The first annual meeting saw an extended program presented at Chicago on January 23d, 24th, and 25th, 1908. President Eliot of Harvard University in the opening address said: "There is a great deal of confusion about the meaning of the term industrial education. Industrial education ought to mean trade schools and nothing but trade schools. They should be either full time schools or partial time schools; that is, all such schools should be capable of being used by boys and girls who devote their whole time to the schools or by pupils who, already at work, are allowed by their employers to give from six to twelve hours a week to the trade school." Later in his address President Elliot urged the "sorting" of school children as a necessary element in their assignment to one school or another. This suggestion has since been a subject of so much discussion that it is of interest to note the form in which it was originally made. Dr. Elliot said "Does democracy mean that all people are alike—does it mean that all children are equal? We know they are not. Many of us have seen that in the same family with the same inheritances and the same environments the children often illustrate an astonishing variety of disposition and capacity. If democracy means to try to make all children equal or all men equal, it means to fight nature, and in that fight democracy is sure to be defeated. There is no such thing among men as equality of natural gifts, of capacity for training or of intellectual power. Germany which is not generally conceived of as a democratic country, and Switzerland which is a true democracy have both discovered how to sort their children. It is done by the teachers and parents in combination and it is the very best thing that a teacher can do for a child, to tell him or her in what line he or she can have the most successful and the happiest life. . . . Here is the teacher's guide in sorting children: Each child must be put at that work which the teacher believes the child can do best. It used to be the way to set children to do the things they cannot do well, but that doctrine I am thankful to say is now outgrown. We have learned that the best way in education is to find out what the line is in which the child can do best and to give him the happiness of achievement in that line."

The chief discussions of the Chicago meeting centered round the appprenticeship system as a means of promoting industrial efficiency and the place of the trade school in industrial education. Other sessions were given to the social aspects of industrial education and to a review of the steps needed to adapt the public school system to meet the needs of those industrially inclined. Bulletins 5 and 6 of the National Society contain the proceedings of this meeting, including the general discussions and a number of practical suggestions as to industrial school organization.

At the time of the annual meeting there was also published, under the auspices of the Massachusetts Commission on Industrial Education, an extended catalog of the industrial exhibit developed by the Chicago industrial education committee and shown in the Art Institute in which the sessions of the National Society were held. This catalog was prepared by Secretary Charles H. Morse of the Massachusetts Commission and gave in some detail the organization of the twenty-four schools whose work made up the exhibition.

One of the most significant incidents of the Chicago meeting was the adoption of a motion recommending the organization of a committee of ten. Shortly after the meeting this committee was organized with Dr. Henry S. Pritchett as chairman. It included besides Dr. Pritchett, Dr. Paul Hanus of Harvard University, Mr. M. W. Alexander of the General Electric Company, West Lynn, Massachusetts; Dr. Thomas M. Balliet, of New York University; Dr. Elmer E. Brown, United States Commissioner of Education; Dr. William H. Maxwell, Superintendent of Schools, New York City; Dr. E. J. James, President University of Illinois; Dr. L. D. Harvey, Superintendent of Schools, Menomonie; Mr. Leslie W. Miller, Pennsylvania School of Industrial Art, and Dr. Charles S. Howe, President of the Case School of Applied Science. In the words of Dr. Pritchett it was the expectation that this committee "will tell how the continuation schools, the schools for industrial training, should articulate themselves with the great public school system of our country."

The Chicago meeting served in a very marked way to stimulate the interest in industrial education the country over. Several of the state committees arranged to organize themselves as state branches and the place of national commissioner having been temporarily assumed by Mr. Alexander, vice-president of the Society, active measures were undertaken by him looking to the development of the interests of these organizations. Within ten months state branches were organized in Alabama, Georgia, Massachusetts, Montana, New York, Ohio, Rhode Island, and Virginia. Bulletin No. 7 was issued in November 1908 to assist in the formation of these branches by giving detailed information in regard to the society. Besides the officers, constitution and list of members, it contains the constitution suggested for state branches with a brief statement of the different ways in which such branches may best be formed.

Following the issue of this bulletin and while the officers were busy in organizing the Atlanta meeting, another important study appeared as Bulletin 8. This was entitled Education of Workers in the Shoe Industry, and was prepared by Mr. Arthur D. Dean, chief of the trades school division of the state department at Albany, New York. This bulletin is typical of a number of studies which it is the intention of the society to publish in the future. It presents the results of a widely extended investigation into the needs of industrial education in the shoe industry and in the various methods which may be found effective to meet these needs. Two additional bulletins, one on Industrial Training suited to the needs of the Textile Industry, and a second one The Training suited to the needs of Machine Trades, are now in active preparation under special committees assigned by the society.

On November 19, 20, and 21, 1908, the organization held its second annual convention at the state capitol in Atlanta, Georgia. A very extended and practical program was then presented, led by Dr. Elmer E. Brown, United States Commissioner of Education and contributed to by over thirty manufacturers and industrial school representatives. Dr. Brown's address dealt with the unifying influence of industrial art and was a strong plea for emphasis upon the aesthetic sides of industrial training. Said the speaker "For forty years or more this demand for fineness and beauty in manufactured products has been steadily gaining ground. Its influence has been clearly manifest in the great world expositions. It has become a well recognized element in international competition. . . . The commercial advantage in the near future will rest with the nation which can make the finest combination of inventive skill, with beauty of design and workmanship."

Particular effort was made at the Atlanta meeting to secure definite suggestions as to the manner in which the many varied plans offered could be effectively developed in practical form. One group of manufacturers discussed the apprenticeship in the factory while other groups of speakers offered plans of work for the public schools, for day trade schools and for evening schools.

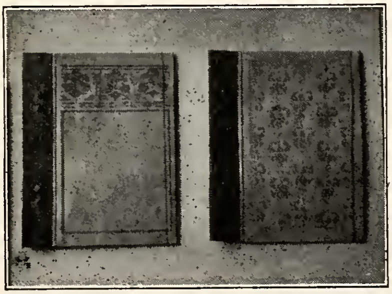
As at the Chicago meeting a large exhibition of work was shown in illustration of the progress made by various institutions. Over a score of technical and industrial schools contributed to this exhibition which filled two large halls and many corridors of the capitol building.

One of the most important contributions to the Atlanta meeting was the preliminary report of the Committee of Ten which had been organized immediately after the Chicago convention. This report did not attempt to analyze the problem in detail but was confined to a consideration of the industrial training for boys and girls between the ages of fourteen and eighteen and of men and women now in the industries who desire to increase their skill and efficiency by further study. Three general types of schools were suggested—a vocational school for the pupil of from fourteen to eighteen, the industrial improvement school, and the trade school for those already in the industries. Discussing the part which a grammer school could play in a system the report states:

"If the grammar schools are to make this connection with vocational schools it is clear that the grammar schools should at some part of their course do their part in developing the vocational purposes of their pupils on the basis of enlightenment concerning the advantages of skilled vocations, including the trades. It is clear also, that every study should be so taught as to bring out its application to life, particularly to the skilled vocations, altho those studies would not be so taught in the grammar school as to promise preparation for any particular trade. It is clear, too, that the grammar school should introduce elementary industrial training in some form, either in the form of manual training at the bench or in industrial pursuits wherever the training could be effectively given. Such an introduction of subjects for industrial training must come thru the substitution of these subjects for something in the curriculum. The way to industrial education lies not in a more complex curriculum in existing schools, but in a larger variety of schools, each with a simpler program and each seeking to do well the work it sets out to do."

It is of interest to note that the committee in concluding its report commended experimentation along very varying lines. It assumed that success in industrial training would not depend upon the adoption of any one type of school and that it was wise for those dealing with the question to welcome at the present time experimentation in various forms of schoools. Ultimately it is felt that by the force of "educational gravitation" all these efforts will relate themselves to the public school system, partly by adaptation of the newly organized schools. In the words of the report, "No series of schools can finally survive which does not so relate itself to the public school education; hence the source from which pupils are to be drawn, must in the long run be the public schools."

In this brief review of the activities of the National Society, but one further reference can be made to the various steps it has taken to promote a wide-spread interest in all forms of trade teaching. This has been its systematic effort to place before its members valuable contributions to industrial education published under auspices other than its own. Among the more important of those which have been sent to its members within the last few months, are two addresses on industrial and trade schools by Dr. Andrew S. Draper, Commissioner of Education, New York State; the Report of the Massachusetts Industrial Commission; a report on the apprentice system by Dr. Wright and a volume on industrial education published in the Annals of the American Academy of Political and Social Science. Of the twenty-three contributors to this volume, twenty-one were members of the National Society. Thru the distribution of these valuable publications and the active correspondence now carried on by the national officers with the nine state branches and the twenty-eight state committees, the organization may justly be said to be fulfilling its function defined by its late president Dr. Carrol D. Wright, as "a clearing house of industrial education for the country."



FROM CLEVELAND, OHIO, HIGH SCHOOL.

THE EDUCATIVE VALUE OF MANUAL TRAINING.

S. Horace Williams.

IN this discussion of the educative value of manual training, I wish to use the terms "motor training," "the manual arts," and manual training very freely, almost interchangeably. The term "manual training" is becoming more inclusive, it being predicted by some leaders in this movement that soon "manual training" will mean the "manual arts" rather than certain limited forms of hand-work, such as sloyd. The effect of motor training upon mental development can be apprehended only by studying the problem from several points of view, the first of which is the structure of the brain.

THE PSYCHOLOGICAL VALUE.

This complex organ consists of two hemispheres, each of which controls chiefly the opposite side of the body, the actual work being done by cells and fibers. Motor and sensory cells occupy the exterior portion of the cortex, while fibers compose a large part of the interior mass. Fibers are not distinct, isolated nerve structure, but grow out of the cells. They are encased by a medullary sheath and transmit nerve energy to the mucles, causing them to expand or to contract. Sensory cells receive impulses from the special senses, the skin or the interior part of the body; motor cells generate nerve energy and the fibers transmit this energy to the muscles of the body, which contract or expand according to the nature of the stimulus. Recent neurology has discovered that the association fibers play a very important part in brain activity, for through them all mental activity is unified and experiences made coherent and meaningful. At birth the brain has as many cells as it will ever have. They grow in size by nutrition and develop through use. Motor and sensory cells reside together but some areas are primarily *motor*, while others are sensory. Further, it has been found that special senses have definite areas in the brain for the registration of one specific, definite kind of impulses: this fact has given rise to the term, "localization of centers." "The visual sensations are registered in the occipital lobes, the auditory sensations in the temporal lobes, the smell sensations in the region of the hippocampel gyre, while pressure, temperature, organic and kinesthetic sensations are located in the great central region known as the somæsthetic area."[1]

Early in the evolution of the animal series, we find no differentiation between tissues for the transmission of impulses. The unicellular organisms were protoplasmic, and even in organisms of a greater number of cells, protoplasm still served as a very imperfect transmitter of impulses. Gradually, certain cells which transmitted stimulations most readily became sharply differentiated and because of this special power, were set aside for this kind of work and eons later, when studied by physiologists and neuologists, became known as nerve-tissue. From this simple origin and gradual development, we have today the central nervous system, with its cortex, medulla, basal ganglia and spinal cord. In the comparatively simple organism, adjustment was a matter of protoplasmic function; expansion toward beneficial and pleasant stimuli enabled the organism to live, but expansion toward harmful stimuli and withdrawal from the pleasant, caused death. Now, many of these bodily reactions were stored away as beneficial by successive generations and transmitted by physical heredity for the perpetuation and growth of the species. In this manner, one generation profited by the life and death experiences of another. "It would seem that the most primitive of mental functions has its basis in the inherited structure of the nervous system in the inherited tendencies to reaction that operate in the beginning entirely apart from conscious control".[2] First sensations are meaningless to the child, and its life in general is possible by virtue of instinctive movements, inherited from racial experience. New experiences with the child acquire meaning through their pleasant or disagreeable sensations and also by the accompanying *strain sensations.* The first result of experience upon adjustment is either to confirm or to inhibit an inherited reaction. The importance of these strain sensations cannot be over-estimated for they are the threads which are necessary to combine and unify the data of sensation into meaningful experience. Some reactions which were of great value ages ago in the development of a species may now have become harmful, so that in this instance, these strain sensations act in an inhibitory manner. Even instinctive reactions are transmitted to conciousness by the strain sensations arising in the tendons. "The muscular adjustments to which the stimulus gave rise are made data of the child's consciousness and become fused with the original sensations which the stimulus aroused. Repetitions follow and this association between the sensation occasioned by the stimulus and the sensations accasioned by the instinctive adjustment to the stimulus, becomes firmly fixed. In adult life, moreover, as in the first mental experience of the child, strain sensations form the threads that weave together the otherwise disconnected strands of consciousness. The use and work of an object are represented by the sensations of strain that originate in bodily adjustment. "Every two elements whatsoever connected together in consciousness are so only because they have motor effects in common."[3] The perceptual process is permeated through and through by experiences of movement. The child repeatedly finds the same complexes of sensations connected with a certain set of activities. He learns this activity as a unit, and the group of eye, ear, and tactual sensations become inextricably bound up with the act and perhaps come to be symbolic of it. The recurrence of one of these sensations serves to call up the image of the others. "The unity in the reference of the sensations comes in on the side of the act. It is as something is done with the object and the various senses cöoperate in the doing, that their unity of reference appears." Professor Bagley verifies the importance of strain sensations by three strong arguments: the proof on the pathological side, the anatomical and the genetic.[4]

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[1] Bagley: Educative Process; ch. IV, especially pp. 77, 78.

[2] *Ibid;* pp. 69, 70.

IMPORTANCE OF STRAIN SENSATIONS.

Under the pathological proof, we have the following argument: "From a study of apraxia, it seems clear that *meaning* and *use* are intimately connected with one another and that loss of meaning carries with it a loss of use and vice-versa. Use, however, must be represented in consciousness by some form of sensation, and the kinesthetic or motor elements involved in sensations of strain seem to be the natural agencies for fulfilling this function." Judging from the anatomical arrangement of the nervous system, including the sensory, motor and association systems, the mind exists for the purpose of adjusting the organism to its environment. On the anatomical side, then, we have the following statement: "Increase of *intelligence* among animals is correlated with increse in delicacy and nicety of *motor coördination.* This delicacy is represented by an increase in the diameter of the pyramidal tracts,—large bundles of fibers that carry the motor impulses from the cerebral cortex to the centers of the ventral and lateral portions of the spinal cord, whence their impressions are distributed along the motor nerves to the muscles." For a long time, there were areas in the brain known as "silent", being situated in the frontal lobes and between the parietal and occipital lobes. Dr. Paul Flechsig discovered that these silent areas do not send fibers to the lower centers of the mid-brain and the cord, but that they are connected by fibers with the sense areas. "The inference almost forces itself upon one that these intermediate areas function in connecting the different sense areas." From this it will be seen that the great somæsthetic area in which are registered the sensations of movement is situated centrally as regards the remaining sense areas. It is directly contiguous to all the great association centers of Flechsig and it doubtless sends association fibers to all these areas and functions thoroly simplified as a centralizing and unifying agency." His genetic proof is based upon the study of children's definitions, which reveal a very strong tendency on their part to define words according to use or movement. As an illustration of this fact, we submit several examples:

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[3] Bagley; pp. 68-74.

[4] Bagley; pp. 75-80.

> Ring. Ring is what you wear on your finger.
> Vain. Vain is as if you always look in the glass.
> Knife. A knife is to cut meat.

This process of making intelligible the data of sensation is known as apperception, the fundamental law of which is: "The unifying of sensations into concrete experiences is accomplished through the adjustment to which the sensations themselves give rise." Professor William James also says that all conscious experience is motor. He holds that every possible feeling produces a movement, and that the movement is one of the entire organism, and of each and all of its parts.[5] These *motor percepts* are developed into *motor ideas,* which become the most vital and potent part of the mind's fund of organized knowledge. Hence we see that the mind acquires a rich fund of motor ideas which throughout life are of vital importance to the individual; we learn that these ideas develop from *strain sensations* and have a *unifying function* to perform in psychic growth, and finally that motorization is of the utmost importance during the early life of the child. Power of control and adjustment of both fundamental and accessory muscles go on simultaneously, but extended use of the large muscles precedes ability to control small muscles in fine, delicate movements. "Nothing short of manual training will reach effectively the important brain cells governing the fine motor adjustments of the muscles of the hand."

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[5] James: Psychology—Briefer Course; pp. 370-372.

Motor cells develop through use. At first there is a lack of control in muscular movements which are spontaneous and random. Bodily needs give rise to muscular activity, and the sensations of strain are registered in consciousness as well as the primary stimulus. Repetition of this activity with conscious selection of the most successful efforts produces accuracy of adjustment. Consciousness now holds in memory the data gained in the later adjustments and comes in the future to direct muscular activity. Here we have conscious muscular control, activity governed by the higher centers; but for the sake of economy of mental energy, an act which has been repeated a number of times descends to lower centers for its control,—to the basal ganglia and the cord. We may almost say that the degree of skill attained in an act by a person depends upon the extent to which the act is controlled by non-cortical centers, for in the animal series, precision of muscular activity depends upon automatic adjustment.

SKILL AND SPEED IN EDUCATION.

The pure intellectual value of the act existed in the primary processes—in the selective activity of the mind when confronted by a great number of good and bad efforts, but an automatic movement means an increase of speed and skill. Hence, to the degree that one desires to develop skill and speed in any process, just to that extent should the child be trained to render the act automatic. Inasmuch as the centers for hand-and-arm-control occupy a large area in the cortex, training of the fingers, hand and arm means the development of these brain centers. When the activity passes from conscious, voluntary control to unconscious involuntary automatic adjustment, the process ceases to be primarily educative and is known as "habit." The acquisition of useful habits is nature's mental economy. It means that the mind is freed from the direct control of multitudinous duties in order to take up the supervision of new activities which require the operation of judgment and reason.[6]

In general, it may be said that the physical and mental needs of a child determine his interests. At first, interests are of a low order, being chiefly physical, and pertaining to the satisfaction of inherited tendencies, but gradually his interests become more and more intellectual. Intellectual or acquired needs play an important role in the mental growth of the child of school age. "It is a maxim that apperception functions most readily along the lines of interest. Interest attaches most strongly to that which has a vital relation to one's well-being. Until some need is distinctly present, the assimilation of experience is slow and halting."[7] *This never-ceasing demand, then, for physical activity along with mental growth becomes the fundamental postulate upon which the argument for the introduction of manual training rests.*[8] Mental and physical activity pari passu are incessantly demanded by the normal child. Professor O'Shea remarks: "As I see it, the motor interests and inclinations of the young lie in the direction of reproducing by the use of suitable materials, the activities which are occurring in their environment. The child is ever seeking to adapt himself to his environment through imitation, and he strives then to copy the work of the carpenter and the blacksmith and the farmer, and others with whom he comes in contact. He has here mental ends given him by his predominant mimetic tendencies, to be realized through motor activities; and manual training ought to start at this point: it ought not to begin with minutiæ and formalities which have not become mental ends to the pupil. It ought not, in my opinion, to start with the theory of the use of tools; but theory here as elsewhere is to be gained largely through actual experimentation in motor experience. I cannot see that the sensory element involved in manipulating a saw can be apprehended any better when taken by itself than the sensory element in learning a word through sight without tracing it or through hearing without vocalizing it. But making the start from the standpoint of the pupil's interests, which are always concerned with the reproductions of wholes, and proceeding gradually in a more analytic way, we shall comply with the principle of making the motor action of the child a consummation of ideational potentialities."[9] Motor activity on the part of the child may take the form of constructive tendencies, in which case the child takes great delight in building things of materials, or his activity may take the opposite course, for many children take intense pleasure in the tearing-down process. Physical exercise deals chiefly with the large, fundamental muscles, while training in the manual arts, and manual training proper, aim to train the delicate, accessory muscles of hand and fingers. In the lower grades, interests are primary, largely physical, conditioned largely by bodily needs. When, however, the child has reached the adolescent stage, acquired or intellectual interests have a dominant place. This reveals the fact that some intellectual interest arising from the study of geography, history or English may supply an incentive for constructive work. This is especially true in the dramatic work of some schools. On the other hand, it is known that constructive work often vitalizes the formal and traditional subjects of the school, for in this case the human element receives attention and even the most uninteresting and repulsive subjects are seen to possess social significance.

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[6] James; ch. X.

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[7] Bagley; pp. 92, 93.

[8] Consult Thorndike: Principles of Teaching; chs. XIII, XIV.

[9] O'Shea: Some Aspects of Manual Training; MANUAL TRAINING MAGAZINE, Jan., 1900, pp. 59-69.

THE BASIS OF ATTENTION.

When the child is satisfying a heart-felt and burning interest, attention is at the maximum. A problem vital to the mental and physical needs of the child is presented for solution. Such a problem secures the absolute mental presence of the child. The incentive for activity is from within. This activity should result in something accomplished, an article constructed, for from the beginning, every individual should be taught to produce more than he consumes. The constructive tendency in children has a profound social meaning; for a prosperous and advancing social order must train producers and assiduously eradicate the destructive proclivity.

Closely allied to this mental value of motor training in general for the large muscles, and of manual training for the accessory muscles, there is an advantage to be gained on the emotional side, especially if we remember that manual training in its broadest significance means learning to enter into organized activity with the hands. Professor Dresslar points out that an emotion is a resulting state of consciousness growing out of present muscular activities or tensions—or the memory of the feeling resulting from like activities and tensions referred to the past. Our feelings are chiefly the outcome of possible muscular behavior which has been established by racial or individual experience. "Whenever we enlarge through manual training the sum of muscular adjustments possible to children or adults, we thereby directly affect their emotional lives. When these activities are directed along useful and liberal lines, the emotions are thereby broadened and deepened to greater responses in corresponding directions."[10]

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[10] F. B. Dresslar; N. E. A. Report, 1907; pp. 766-72.

Knowledge which is acquired by the manipulation of tools and materials has a greater permanency and meaning than information gained in a passive and formal manner, because such knowledge comes to the child through many avenues; all senses are open and in each instance several of them are operative in transmitting messages to the mind concerning sight, smell, taste, feeling and tactual qualities of an object. The greater the number of senses operating to give an idea of an object, the greater the intensity and perfection of the concept. As the mind develops through sense experience, at each succeeding stage of individual growth, less emphasis should be placed upon objective instruction and correspondingly more upon pure reason,—conceptual judgment. Primarily, in the grades, manual training should be a means toward an end, and this goal is mental development. A mind which has gotten into the habit of depending upon objective illustration for the presentation of every new idea displays a deplorable weakness in imaginative life and in the power to reason consecutively upon an abstract subject. To some extent, however, constructive imagination and reasoning of a high order find an important place in manual training. The problem before the child is of immediate, personal interest, He must select facts which are pertinent and practical for the work in hand. Oftentimes, he must picture in his imagination the project as it will look when completed, and actually make a design, with all of its minute details to serve as a guide when he really begins the tool processes. Ability to discriminate, to select and to organize facts determines largely the character of the worker and of the project under construction. Here more than in most other school work, knowledge is self-testing. A child's own completed work is either his reward or his punishment;—for standing among all of the other projects of his class-mates, his work tells the tale: intense pleasure or deep pain can be seen in his features as he observes his work. When some fundamental principles of construction and of design have been learned no better opportunity can be given for the development of the power to reason and a reasonable degree of constructive imagination than to encourage the child to construct and to design with very little supervision on the part of the teacher. In this manner, originality, initiative, self-confidence and power to think logically along certain lines characterize the wholesome mental growth of the child.

Most of the work of our schools deals with abstract material found in text books. This sort of work requires a vast amount of memorization, which soon renders the normal, active child restless and passive.[11] Personal interest in the work is absent, attention lags and as a result, little actual mental growth is experienced and the child is regarded as stupid. He resents being held quietly in a seat five or six hours a day at book-work, so when his period for shop-work arrives, he leaves his books with the exultant feeling of a liberated slave. Manual training means to him mental relaxation even in the most formal and stereotyped systems. In New York City, many schools have a very formal system of bench-work, but here it has been estimated that above 90% of the boys doing this work take great pleasure in it. The fact that manual training offers a change of work and at the same time trains the mind in processes of great value from many points of view amply justifies its introduction into the crowded school curriculum.

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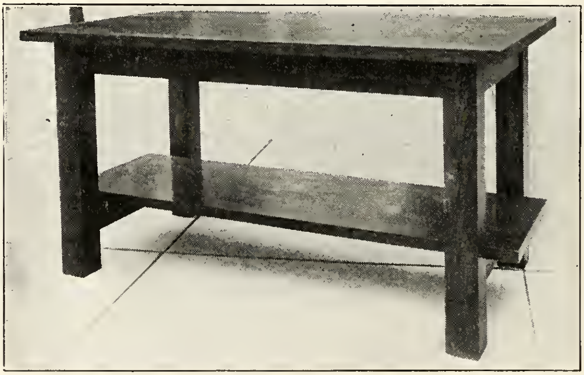
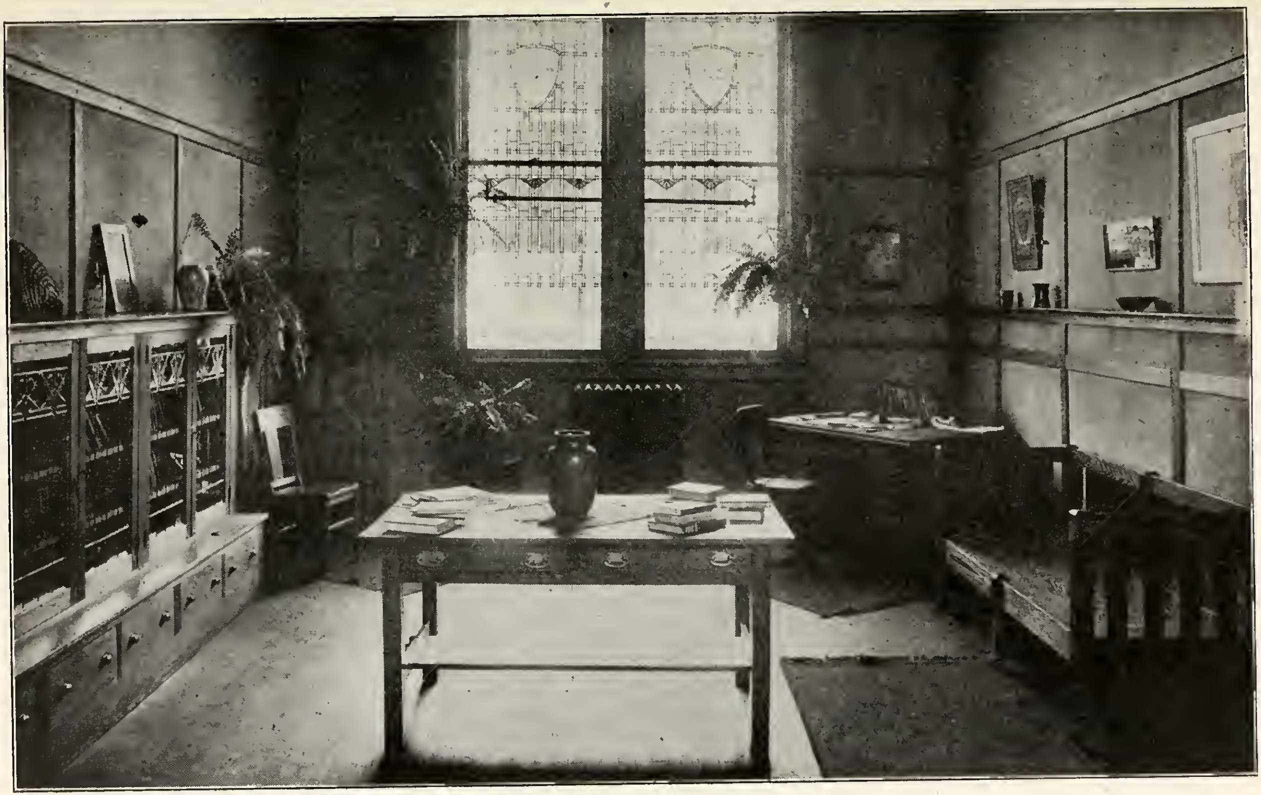
[11] See John Dewey: The School and Society; ch. I, especially pp. 30-37; ch. II, pp. 47-55.

(*To be continued.*)



MADE BY PUPIL IN DECATUR, (ILL.), HIGH SCHOOL.



OFFICE OF PUBLIC SCHOOL NO. 45, INDIANAPOLIS.
FURNITURE, WITH EXCEPTION OF BOOK CASES, MADE BY BOYS OF THE 7TH AND 8TH GRADES.

A COURSE OF STUDY IN MANUAL TRAINING.—VII.[1]

CHESHIRE LOWTON BOONE.

THE building of a course of study is something more than the mere collection of a number of problems without regard to their interrelation. The interests of a given locality, the rate and methods by which children learn, and the character of the general curriculum are all important factors in planning the industrial work for a school. Instruction in handwork should aim to bring before children at critical stages in their education, those ideas, conceptions and processes which pupils are ready to digest. Having learned certain elementary facts of form, size and construction in the primary school, the pupil is ready to elaborate these and employ his knowledge in handling a new material or problem.

Each year he becomes physically stronger, goes about more, sees more things and becomes more and more able to discriminate. Consequently his ideals and interests shift from year to year, reaching in the grammar school a stage where *use* is the chief characteristic of all things.

In the fifth and sixth years pupils are able to do better work on the technical side, having had enough experience and acquaintance with processes to grasp them. Moreover at this time boys and girls begin to have separate interests. Both have leanings toward the utilitarian basis of value. Boys show pronounced pleasure in mechanical things; girls obtain pleasure and consequently profit from the simpler crafts and handwork of a domestic character related to household affairs. With both boys and girls the work chosen for a given course will involve much study of design, careful planning for a stated purpose, and sustained effort along one line for a considerable period. The chief consideration at this time, is that, after the modeling and cardboard construction of previous years, some kind of handwork should be employed which is technically more difficult and which demands more forethought and study of design.

GIRLS' CLASSES—GRADES V TO VII.

A. *Sewing and Textile Work.*—Under normal conditions, that is in the average school of a town or small city, sewing might occupy the

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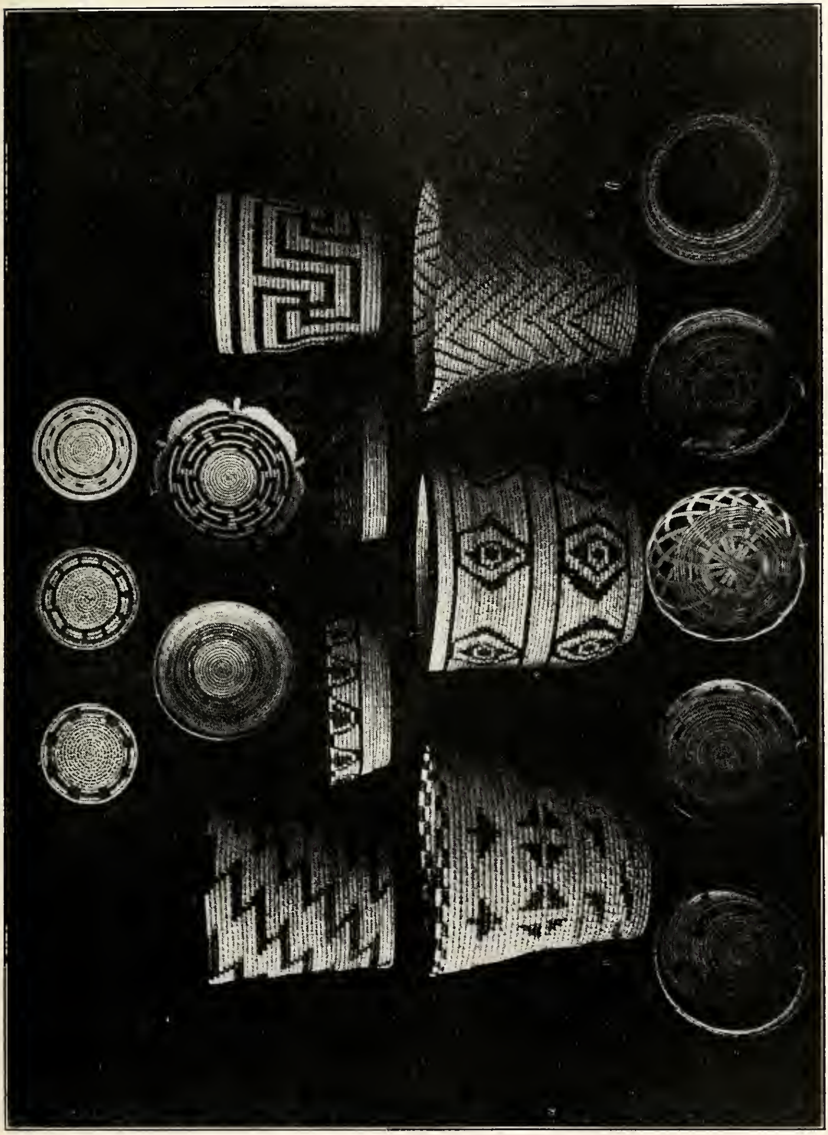


BASKETRY. GRADES V AND VI.

major part of these three years, making a fairly complete course. Three years would offer time enough to learn all the sewing necessary for a girl who intends to leave school at the close of the last grammar school year. In the average town, three years of practical, sensible sewing, which included the problems a girl would meet both for personal needs and domestic purposes, would furnish manual training, or better, industrial training of the highest type, and would be interesting as well. Such work might and should include the simpler forms of applied design, as stitches for decorative purposes, stenciling and block-printing or articles for ornament and use, as school bags, book covers, pillow tops, curtains, etc. Sewing is most attractive to pupils (a) when it is employed for some real problem, as a garment, pillow, bag, apron or cap (for cooking class), and (b) when it is used to fill an esthetic need. Mere practice of stitches and the drill so often seen in school work are not at all interesting, and the instructress will do well to teach all the sewing she can in connection with some article which is of itself worth while. One finds in almost every school a hard and fast list of exercises, as stitches, darning, matching, mending, etc., all of which must be learned to be sure, tho they are not in the least interesting. If the teacher will enliven her work and refresh it with problems which have a direct appeal to her pupils, she can from time to time teach the dreary principles and fundamentals with less friction and more speed. There should be no such thing as a fixed course of study in sewing or any other kind of work. The aggregations, called courses, are not likely to have any valid claim to pupils' interest. No two classes are alike in temper or ability, and in time even the best problem ceases to inspire because of great familiarity with it and a tendency to teach it perfunctorally. Fixed courses, planned by adults in the seclusion of the office have not the spirit which may be found in those schemes made for particular classes. To be sure, the latter may not be as a whole, useful for the next class, but one has learned something, which makes it easier to plan again.

B. *Craft Work.*—There are other forms of craft work, which if they do not have the same utilitarian value as sewing, still offer a similar constructive training in material suitable for girls. Basketry, bookbinding, stenciling, and weaving are ideal for grammar grade work and might occupy a portion of the three years with sewing. They offer numerous excellent problems in design for articles of use and decoration. Some one or two of these crafts with a year or two of sewing make a rich and interesting course which appeals to the majority in a way to retain their best efforts.

C. *Cooking.*—Little need be said here about cooking. Save in special instances this subject should not be offered until the eighth year and high school. The same principles apply to teaching this subject as to any form of industrial work. It should be so presented that pupils feel that they are getting hold of it *as a subject*. The mastery of a given number of recipes is only a part and a small part—of learning to cook. It is just as important that girls learn to serve dishes and meals in appetizing fashion, to arrange the table properly and to compose menus with discrimination and taste. Foods cannot be combined haphazard. As a final exercise every pupil should present complete menus for given times, some of which should be prepared by the class.

A schedule combining the several kinds of handwork in good proportion would be somewhat as follows:

Year V. *Basketry*—

a. Raffia mats with pattern in color; original designs.
b. Simple sewed baskets, using at least two stitches.
c. Baskets with pattern in color; covers, handles, hinges.
d. Reed mats and baskets.
e. Baskets and mats with colored weavers.
f. Handles, covers, etc., for reed baskets.
g. Baskets other than round, woven tops for stools, etc.

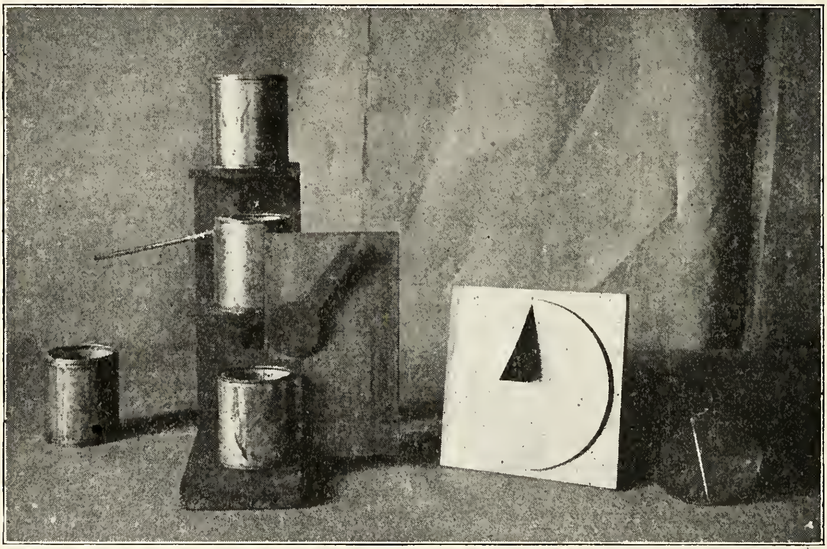
This might easily be made a two years' course but it is not usually advisable.

Year VI. *Book-binding, Weaving, Stenciling, with Sewing;* any one of these.

1. Book-binding:
    a. A number of preliminary exercises with heavy cardboard covered with cover paper or book linen; as portfolios, post-card albums, note-books, etc. These things involve many of the manipulations essential to real book-binding.
    b. Decoration for preliminary problems, either by stencil, wood block, or drawn lettering and ornament.
    c. Simplest form of sewed book.
    d. Full bound book.
    e. Rebinding of an old book.

2. Weaving:
   a. Simple rug patterns on hand loom.
   b. Weaving figure in center of rug.
   c. Narrow woven pattern, as belt, with pattern in color.
   d. Weaving design in fabric from which certain threads have been pulled.
   e. Weaving on large linen or rug loom.

One or more of these phases of weaving will be found in current courses, but seldom a unified scheme for weaving as a whole, tho it has many possibilities thus far ignored.



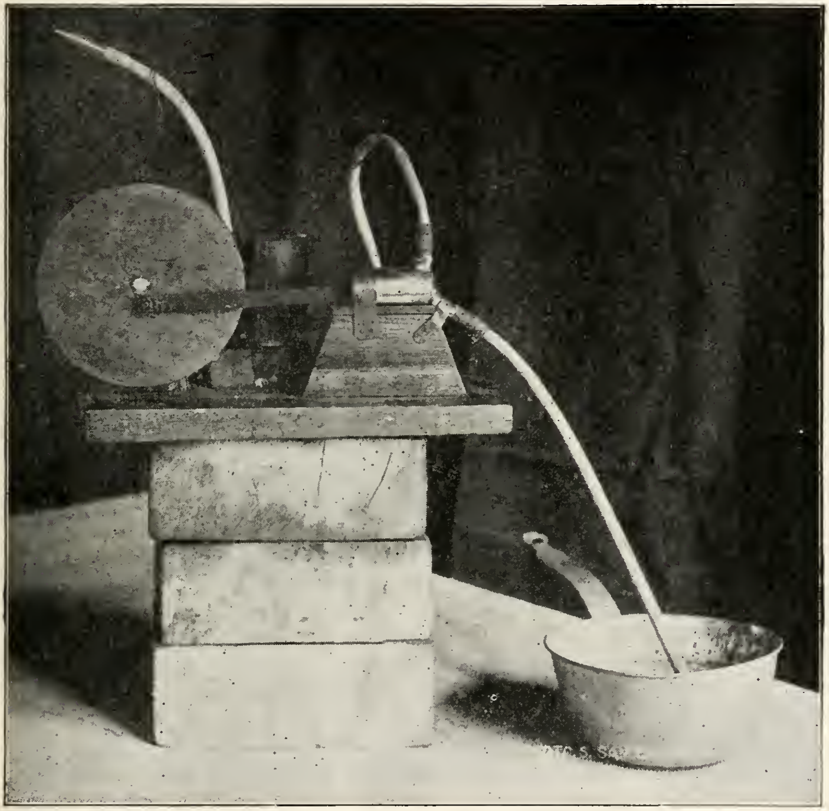
WATER CLOCK AND SUN DIAL. GRADE V.

3. Stenciling and block printing with sewing:
   a. Very simple design units applied to mats, bags, etc.
   b. Pillow tops—the symmetrical and radiating patterns.
   c. Curtains and hangings; use of larger motifs and patterns for corners.
   d. Stencil pattern outlined with stitching.

This line of work will include much preliminary study of the stencil pattern, use of color and media and a good deal of practice previous to serious creative work.

WORK FOR BOYS—GRADES V TO VII.

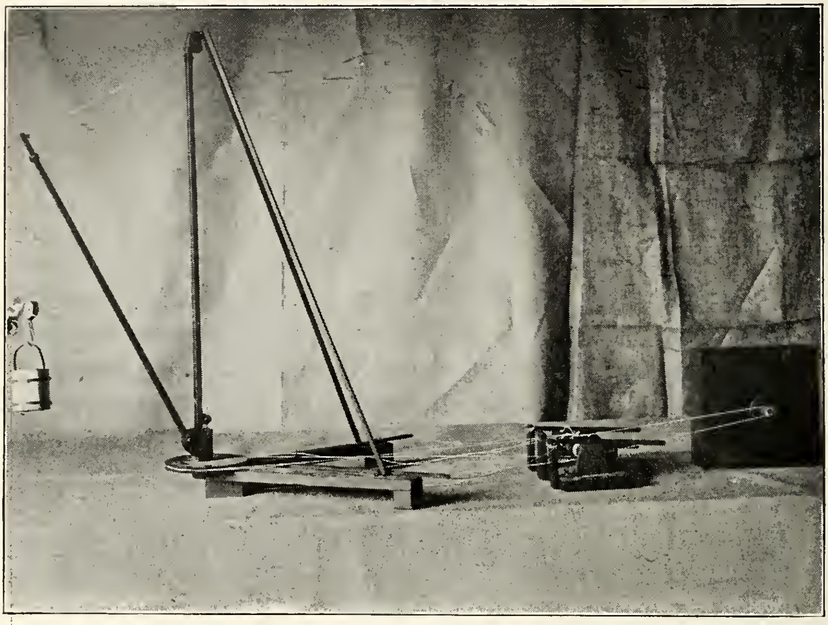
There seems to be no inherent reason why handwork for boys should be confined to woodwork, save that courses were planned for wood in the past. Now concrete and metal are coming to be more used than wood, which is rather expensive.



FORCE PUMP, TO BE OPERATED BY WATER WHEEL. GRADE VI.

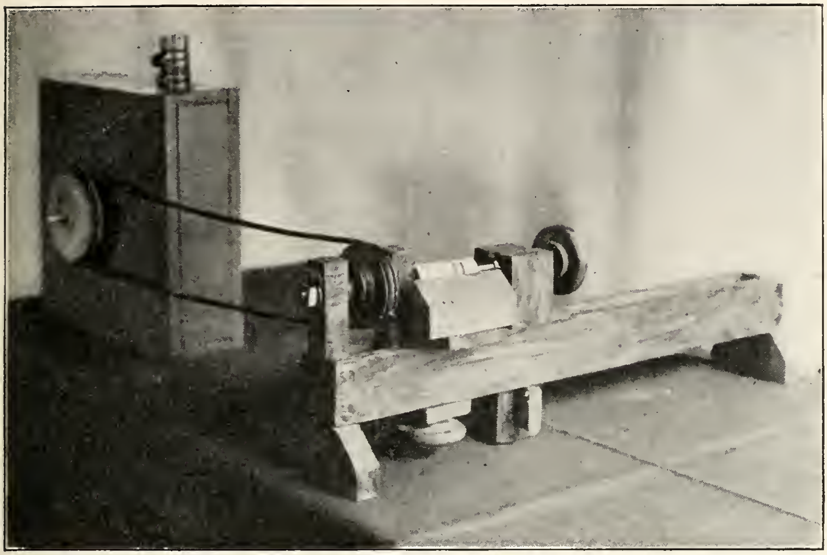
One can see in exhibitions signs of a tendency to use material which fits the problem instead of devising bizarre things which can be made in wood. No doubt for many years to come wood will be the most important shop material for schools because the shops are equipped for woodwork. Also the technic of operations in concrete and metal are not well enough organized or simplified for use in the elementary school. But whatever the material, it is proper and satisfactory to the degree in which it fits a given problem—the latter is the main consideration.

The composition of a shop course depends on three factors: (a) native interests of the pupils (boys), (b) their previous industrial training, and (c) the future in store for boys on leaving the shop. The first two factors determine the character of beginning shopwork, and the third governs the kind of instruction after that.

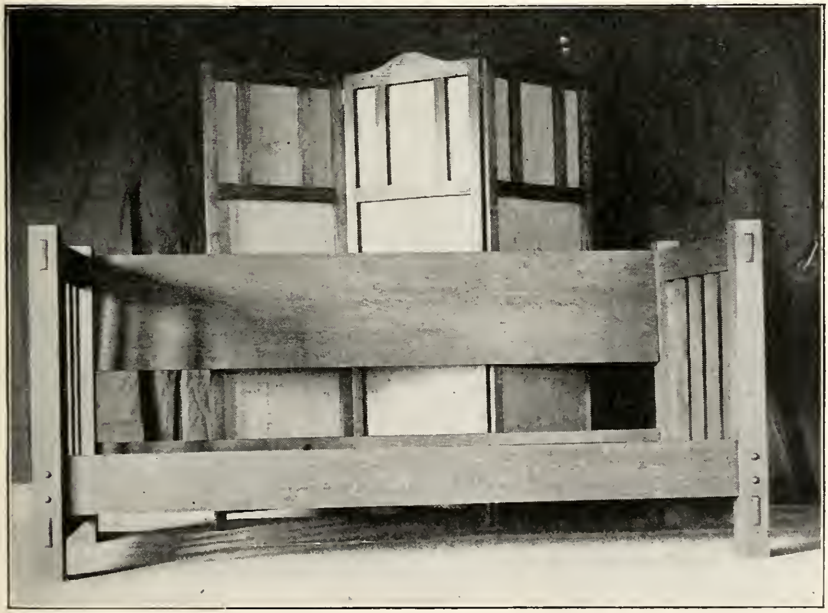


WATER WHEEL CONNECTED WITH DERRICK WITH ALL THE MOVEMENTS OF A REAL DERRICK. GRADE VI.

Granting that pupils must learn to use tools, must become familiar with the essential processes of construction; and develop adequate standards of technical excellence, too large a dose of such work is fatal. it is not nearly so vital a question, what tools shall a boy use, as is the query, what shall he make. The first year or so of shop work is a novelty and boys' innate desire for activity and love for doing and making, carries them thru. But the coat-hanger-book-rack-plant-stand type of work, however well presented, makes but a limited, temporary appeal. It should be liberally supplemented by subject matter



WATER WHEEL CONNECTED WITH MODEL LATHE. GRADE VI. THIS WOULD BE A BETTER PROBLEM FOR GRADE VII.



FURNITURE—GRADE VIII.

which takes hold of real, boyish enthusiasms. A toy, machine, or any construction for play purposes exerts a much stronger educational pull than any single exercise, or group of exercises whose only relation one to another is that of technical sequence. The boy will work for the accomplishment of his own desires in a way he never will work for abstract ends.

MECHANICAL PROBLEMS.

So as a general statement one may say that each year in the shop should offer *some one or more mechanical problems.* By means of these a strong appeal is made to the boy's utilitarian bias and sense of efficiency. He is primarily interested in the thing because it has a purpose, and works to accomplish that purpose. If the machine or toy works, if it accomplishes the purpose, the boy is satisfied. And he can only reach this point by doing his work well enough so the thing will work.

The apparent difficulty here is the lack of specific directions and information concerning mechanical problems. The shop teacher must hunt up data and devise problems, or adapt constructions to school uses. It is most important that teachers shall make themselves familiar with industrial topics for this purpose. Electrical construction and theory, the uses of currents, water wheels, turbines, air pumps, printing, kites, etc., are some of the topics which are intensely interesting to boys and with which the teacher will have to deal.

The schedule of a course along the lines mentioned would be about as follows:[2]

Year VI:

1. A number of exercises to give technical facility and to illustrate methods of construction. These problems should be fine in design and so worth preserving when finished.
    - a. Desk or library furnishings; as calendar, book-rack, blotter-pad, letter rack, ink stand, simple shelf or bracket.
    - b. Tea pot or plant stand with suitable decoration.
    - c. Bird houses, traps, cages. There are a number of constructions in connection with animal life and nature study which are most excellent—if they are desired.

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[2] No specific exercises for knife work are included in this outline because it is a wasteful method of training. The results possible with a knife are few and those scarcely worth the energy and time to make them. When boys begin shopwork in wood they should have the use of a bench and what tools are needed.

2. At least a third of each year, perhaps more time, should be given to some mechanical study, as
   - a. Weather vanes, wind-mills, with pump attached.
   - b. Devices for keeping time, sun dial, water clock. This water clock may be designed in attractive form. Clock case.
   - c. Sand motor, water wheels of several kinds.
3. Mechanical drawing, mostly practice in reading drawings from the blackboard and copying them for note-book, etc.

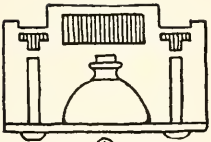
Year VII:

1. Technical exercises as in year VI.
   - a. Teapot stand or similar problem if not used in previous year.
   - b. Boxes: Mail box, work box with cushion cover, tool box.
   - c. The smaller articles of furniture, as hanging shelves, tabouret, umbrella stand, table.
2. Mechanical projects.
   - a. Wooden molds for concrete, as for rectangular fern box or flower pot. The modeling classes could make glazed tiles to set in the sides.
   - b. Kites: an excellent topic to illustrate the conservation of strength and weight. A kite flying competition toward the end of the year is a proper culmination of the study.
   - c. Printing: The construction of small press using type and wood blocks. Study of methods of reproduction, as woodcuts, zinc etching, chalk-plate.
3. Mechanical drawing.

   Boys should learn to make working drawings of some of the projects. By the end of year VII the pupils ought to be able to use drawing for simple things with some ease.

ENDS TO BE SOUGHT.

A course, based upon subject matter like this offered, should accomplish two ends, and will if rightly taught: (a) It should encourage good workmanship, not because any boy cares about technic—he does not—but because he wants to satisfy *use.* (b) It will widen and unify the pupil's knowledge about industrial matters. Industry has a large share of notice in these days, and a goodly number of boys come in contact with industrial questions at an early age. Finally, such a course, involving concentrated and sustained study of a group of problems, all illustrating the same theme fosters the creative abilities. This is to be desired.



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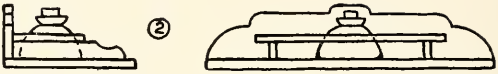

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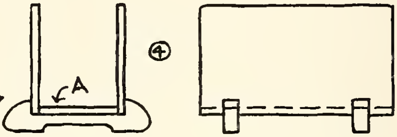
Two types of ink-stands which offer excellent and useful problems in design & construction.

This letter holder is of the knock-down variety. Bottom piece 'A' holds the two sides in place →



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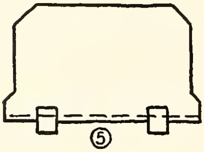

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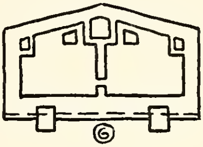

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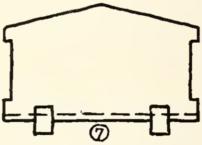

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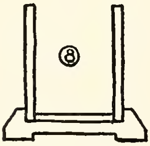

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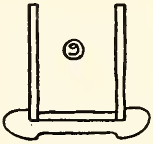

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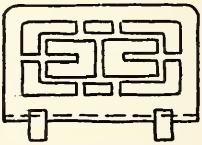

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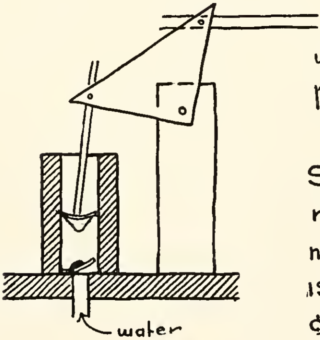
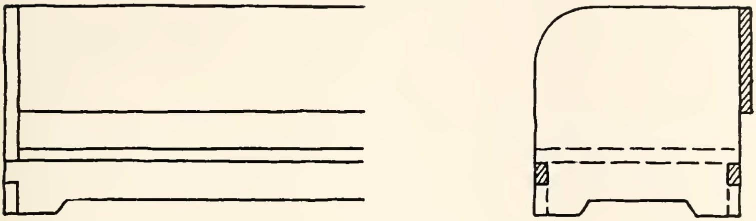
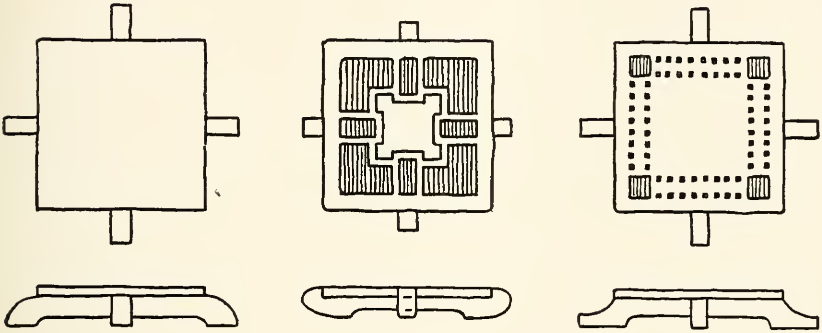


Rod connecting pump with water wheel or other power . . .

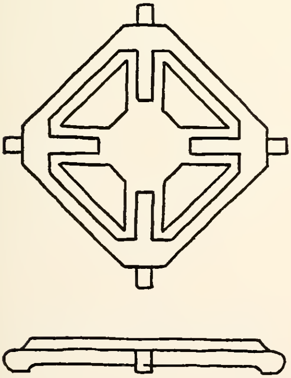
Simple pump and transmission. A type of mechanical problem which is possible for lower grammar grades . . . . .



A book rack which can be made of rather light stuff and which is still rigid · ·



· Teapot · Stands ·



These stands should be 6" to 9" in diameter · · They may be decorated either with incised line or flat tones of color · · · · ·

The following books and articles are suggestive:

The Constructive Interests of Children, by Kent.

Year Books of the Council of Supervisors of the Manual Arts:
  (a) Constructive work, by Miss Soper, vol. 7.
  (b) Centers of Interest in Handwork, by Boone, vol. 7.
  (c) Adaptation of Pattern to Material, by Haney, vol. 7.
  (d) Bookbinding, Elementary, by Miss Cremins very good, vol. 7.

School Art Books, Davis Press, Worcester, Mass.
  Basketry, by Turner, May, June and Nov., 1905; May and Oct., 1907; Jan., 1908. The best treatise on reed basketry published.
  Wood Block-Printing, March and June, 1907; Oct., 1908.
  Bird Houses, Feb., 1909; April, 1906.

Manual Training Magazine:
  Wood Block Printing, Oct., 1906.
  Kites, Feb., 1909. A very complete paper on kites and kite flying.

Harper's Electricity Book for Boys, Harper & Bros., publishers:

Bookbinding, by Cockerell. Excellent treatise on this subject.

Problems in Furniture Making, by Crawshaw. Full of good designs.

Such magazines as The Craftsman, Popular Mechanics, and Popular Electricity.

EDITORIAL

LOOK over ten high school courses of study picked up at random and you will find that nine of them are manifestly planned to fit pupils for college. Talk with the high school principals and you will learn that even the English courses and the mechanic arts courses, which look like finishing courses, will fit students for certain departments in the State University. Look over ten grammar grade courses, also picked at random, and you will find that all ten of them are planned to fit pupils for the high school. Talk with the teachers and you will learn that they advise all their pupils, except the dunces, to go on to the high school, and the reason they don't advise the dunces to go is that their going would reflect upon their teachers. The more one studies the situation the more certainly is he led to the conclusion that the aim of the elementary school is to fit for the high school, which, in turn, aims to fit for the college, and in many cases the aim of the college is to fit for still higher work in the university. The American school system, whether we like to admit it or not, is very largely a straight and narrow road from the kindergarten direct to the university. And if a pupil switches off at any point, he is looked upon as getting out of the royal road and very likely going to his educational doom. If he takes a side track leading quickly to industry he is looked upon as foolish or dull or warped in some way—really an inferior person, when as a matter of fact, in doing so he may be starting toward his highest possible place in the world. Higher book learning does not provide the only road to success in life, yet the school recognizes no other—alas for the ninety per cent that fall out by the way!

English Schools Train for Industry

In marked contrast with our American system is the elementary school system of England. In the English council schools, the straight course is from the infant school to industry, and it is only the few selected pupils who go on to the university. In these schools, which correspond roughly to our public schools, it is taken for granted that every boy on leaving school will earn his living in some kind of manual employment, working under some other person, and his course is shaped with this in mind. But one needs to remember that in England there are also many private and endowed schools constituting another parallel system which, like our own, does lead direct to the university. It seems very desirable, then, that the American public school system, where practically all children, rich and poor, are educated together, should combine the advantages of both of the English systems. Under our conditions it seems only reasonable that our system should train equally well for both industry and the university, but to do this we must recognize the industrial aim as a worthy one and change our courses accordingly. This may mean changes in several directions, but certainly one of these must be in giving more time to the manual arts in the upper grades. It may mean a simplification of the matter of instruction in all subjects; it may also mean that the departmental or high school organization will begin at the opening of the seventh grade, but it surely means more thoroughness in the subjects which are taught and the elevation of the manual arts to the same plane as the major subjects of the course.

The Munich Plan

In this connection we may well consider the epoch-making changes going on in the city of Munich under the supervision of Dr. Georg Kirchensteiner. In the Flurstrasse School, a *volkschule,* under the principalship of Heinrich Eber the following programs of studies are carried out in the eighth grade:

For boys—

Religion	2 hours a week.
German Language	2
Reading and Literature	3
History	2
Practical mathematics, including Bookkeeping	4
Mensuration of Solids	2
Natural Science, (a) Theory	2
(b) Laboratory, Physics	2
Chemistry	2
Handwork; Woodworking and metalworking, each a half year	4
Drawing	5
Gymnastics	2
Total	32

One hour of the time given to drawing is devoted to working drawings in connection with the shopwork. The remainder is divided between freehand and mechanical drawing.

For girls (who are in classes separate from the boys)—

Religion	2 hours a week.
Reading and Literature	3
German Language	3
Domestic Economy; (a) Theory	4
(b) Practice	4
Drawing	2
Singing	1
Gymnastics	2
Needlework	4
Total	25

These programs are significant for many reasons. Notice that the boys have 32 hours of work while the girls have only 25; the boys have 6 hours of mathematics while the girls have none apart from their domestic economy, which includes some work in applied mathematics. The boys take physics; the girls do not.

But especially notice that in this finishing year of the elementary school the emphasis is placed on practical mathematics, laboratory work in science, drawing and manual training for the boys—in all 21 hours out of the 32—and on domestic economy, needlework and drawing for the girls—in all 14 hours out of the 25. The director of the school says that the guiding principle in the selection of studies is to follow the natural development of children and at the same time to recognize probable future occupation. In this connection it should be stated that in the eighth grade only is marked emphasis placed upon vocational work. The work of the grades below the eighth is no more vocational than that in our own schools, except that it is more thoroughly done than in many of ours.

A Suggestion from Germany

While it is evident to every American who studies the schools of Germany that we cannot successfully adopt all the features of German industrial education, it is equally evident that we can get many suggestions from German schools, and to us it seems clear that the schools of Munich offer suggestions of special value with reference to some of the present organization problems of the upper grammar grades. If we were to adopt the Munich plan for the eighth grade, or incorporate into our program of studies for the seventh and eighth grades the essential features of the Munich plan, several of our problems of time allowance, selection of studies and correlation would at once vanish. It is probable, too, that in doing so, we would be going about as far as we ought to go in the direction of vocational training in the elementary schools. Whether this plan is better than two parallel courses in these grades—one leading directly to industry and the other toward the university is of course an open question, but we are sure that many hold to the opinion, which they believe to be supported by sound psychology, that to enrich the elementary school on the side of industry, even to the extent of giving considerable training that may fairly be looked upon as vocational in character, will in the long run prove a benefit to the boy who goes on to the university even though he may suffer some slight temporary disadvantage, and most certainly to the boy who never goes beyond the high school. Indeed, for the boy who stops at the end of or part way through the high school course, the emphasis given to practical mathematics, science and the manual arts in the grammar grades would be but the beginning of a course of study rich in vocational elements which might culminate in technical and trade courses during the last two high school years. It would seem to be evident, then, that the large majority if not all of the pupils in the upper grammar grades would be greatly benefited by making at least the eighth year work decidedly vocational in character.

—C. A. BENNETT.

A Boston Experiment

It is encouraging to notice that the historic North Bennet Street Industrial School in Boston has just begun an experiment in line with the above suggestion. For more than a quarter of a century this school has been working for social betterment through education in efficiency and respect for labor. It has not only worked, but has worked effectively, for largely thru the success of its experiments, the Boston public school system has been successively modified to include kindergartens, manual training, cooking and sewing, vocation schools and playgrounds. In 1907 a special class of public school girls was received at the school for industrial work which occupied nearly half of their time and included sewing, textiles, design, cooking, laundrywork, and general housekeeping. The success attained has led to its continuance and to the establishment of a similar class for boys. Twenty boys between thirteen and fourteen years of age, selected from the grammar grades of the Eliot School have been organized into a class at the North Bennet Street Industrial School in accordance with plans submitted by the director of the school, Alvin E. Dodd, and approved by the School Committee of Boston. The experimental course of study adopted is as follows:

Shopwork; wood and metal,	6	hours, 30 minute periods.
Printing ……	2	hours, 30 minute periods.
Practical mathematics …..	3⅓	hours, 40 minute periods.
English Literature and Composition ……………	6	hours, 40 minute periods.
Geography and History ….	3⅓	hours, 40 minute periods.
Drawing, Freehand and Mechanical ………..	1⅓	hours, 40 minute periods.
Hygiene and Personal Habits ……………….	½	hour, 30 minute periods.
	22½ hours.	

Fifteen minutes are allowed daily for recess and fifteen for general exercises. Both the manual and the academic instruction are taught by the same teacher and all the work is done in one building. A close correlation of subjects is being worked out. The point of view of the director is found in the following statement:

> The course in shopwork will not aim at perfecting the pupils in any particular trade, but will rather give experience in different materials and processes, provide the pupil with a better basis for judging his own preferences and ability, give more skill in the use of his hands, and some insight into industrial practice and meaning of work. It should cultivate resourcefulness, perseverence, habits of industry, responsibility, self-control, and self direction. By a certain amount of division of labor on the part of the pupils, and by the use of time sheets and cost sheets an approach would be made to trade conditions.
>
> Industrial work, however, is not enough for industrial efficiency, which is the basis for social efficiency. It requires a background of general intelligence to be acquired through coördination with academic work. It is not planned to further crowd an already crowded curriculum, nor to cause the elimination of important subjects; but these should be industrialized and socialized, and for economy of effort and better understanding, closely correlated, not in a formal and slavish fashion, but in the thought of pupil and teacher. Such a course may be counted on to remove academic prejudice against manual labor, and so to establish for the future worker a better attitude toward his work and greater happiness in performing it.

—C. A. B.

Cleveland Elementary Industrial School With the beginning of the present academic year there is opened in Cleveland a school which should create a marked interest among educators thruout the country. This school is the result of an effort to meet the increased demand for industrial education in elementary schools. The program as outlined differs in one important particular from the methods looking toward the solution of the problem in other parts of the country. While handwork is to have an important place in the course with the thought of laying a foundation for practical industrial work in the future lives of pupils whose tendencies are towards industrial pursuits, the prime motive is to afford another opportunity for graduation from the public schools to that large class of children who, because of certain differences in mental attainments, are unable to meet the traditional requirements of the regular elementary school curriculum, thereby setting a broader standard of culture for grammar school graduation.

The school is open to both boys and girls of the sixth and seventh grades subject to the recommendations of teachers and principals and with the consent of parents. The school day is divided into eight three-quarter hour periods with an added period at noon for lunch. Half of the time is devoted to handwork, and the remaining half to academic work with appropriate allowance for study periods, music and gymnasium. The handwork consists of a variety of crafts and drawing, including home science for girls. The academic work is devoted in general to English, arithmetic and history and geography, presented graphically and concretely and with very definite relation to the handwork.

—W. E. ROBERTS.

Spelling Reform With this issue we begin the use of the simplified spelling known as the Twelve Words adopted by the National Education Association. They are: catalog, prolog, demagog, pedagog, program, tho, altho, thoro, thorofare, thoroly, thru, and thruout. But these words do not represent the scope of our desire for reform in spelling. When we receive three forms of the same word in one manuscript, and find no agreement among publishers of dictionaries, it becomes evident that there is need of reform. For example we find freehand, free-hand, and free hand; classroom, class-room, and class room; oilstone, oil-stone, and oil stone; crosscut-saw, cross-cut-saw, and cross cut saw. Manifestly it would be better if we could all agree to use the same form. Probably that is too much to expect, but certainly there can be less confusion than we find at the present time. With the hope of starting an interest in this subject, we give below a short list of words in the form we prefer. This list has not been prepared in a hurry, but is the result of several years of observation and comparative study in the course of editorial work. If our readers agree with us that these forms represent "good use" at the present time, we hope they will use them and encourage others to use them. Moreover, we would be glad to have anyone who is interested in this kind of spelling reform send us a word of encouragement, suggestion or criticism. The list is as follows:

Form A—

bitstock
blueprint
bookbinding
classroom
classmate
crosspiece
countersink
freehand
grindstone
metalworking
nailset
oilstone
sandpaper
schoolroom
screwdriver
shopwork
spokeshave
underglaze
woodworking

Form B—

auger-bit
back-saw
bench-hook
bench-stop
block-plane
book-rack
brad-awl
crosscut-saw
cross-hatching
face-plate
jack-plane
oil-can
plane-iron
quarter-sawed
rip-saw
stright-edge
smooth-plane
shooting-board
try-square
tee-square

Form C—

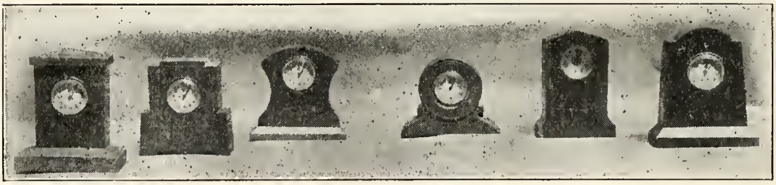
combination plane
cross-lap joint
dovetail joint
drawing board
firmer chisel
framing square
glue joint
marking gage
mechanical drawing
miter joint
mortise-and-tenon joint
mortise gage
pencil gage
slitting gage
water color
wood finishes

* * *

We have been much interested in the announcement that the State of California has just opened a new Normal School of Manual Arts and Home Economics at Santa Barbara. We believe California is the first State to take such action, though Kansas offers special manual training facilities at Pittsburg and Illinois at Normal. This new school is really an outgrowth of the Anna S. C. Blake Memorial Training School, and is occupying rooms in the Blake Memorial building for the present. Miss Ednah A. Rich, principal of the Blake School has been elected president of the new State Normal. The school is open to teachers bringing testimonials of satisfactory experience; to normal school and university graduates; and to students who have done one year of normal or university work in education. The five normal schools in the State will send their students to this school if they wish to specialize in the manual arts or home economics. Let other States take notice.

* * *

The School of Industrial Arts, Trenton, New Jersey, is just inaugurating a new plan of coöperation with the factories whereby apprentices will be required for their own good and the good of their employers to attend evening classes at the school during their apprenticeship. Two features of the plan are especially interesting: First, the school work is compulsory. The aim is to bring about through coöperation what has been done in certain German cities through legislation. (We wonder whether the Trenton manufacturers, like the German masters, will shorten the hours in the shops for these boys on the days they go to the school.) Second, the plan of exchanging monthly reports. The school will report the progress of the apprentice in his studies, and the manufacturer will report progress in the shop as related to the school work. The coöperation is expected to be very close.



DESIGNED AND MADE BY PUPILS AT LANE TECHNICAL HIGH SCHOOL, CHICAGO.

ASSOCIATIONS

NATIONAL EDUCATION ASSOCIATION.

The forty-seventh annual convention of the National Education Association occurred at Denver, Colorado, July 3-9, 1909. The meetings of the National Council of Education were held on Saturday and Monday, July 3-5, and the meetings of the various departments and the general sessions were held on Monday to Friday, July 5-9. The attendance was a disappointment to those in charge, and was distributed as follows: former active members, 539; new active members, 276; associate members, 4,560; total, 5,375. To this total will be added, to complete the record for the year, more than 5,000 active members not present at the Denver convention who will pay dues for the current year, and such additional new members as may be enrolled before the lists go to press, about November 1st. It is expected that the total enrollment for the year will reach approximately 11,000.

From the point of view of able programs, development in educational work, and internal changes in the organization of the Association, this convention is considered one of the most important in recent years. On the recommendation of a committee appointed to consider the matter, the number of Departments is to be materially reduced.

On recommendation of a committee offered by Charles H Keyes it was decided that one full session of the next council meeting in 1910 be devoted to a discussion of the question of the place of industry in education, and that the 64,000 word report which a committee of educators has prepared after a year's work, and which is supposed to be the greatest review of the problem ever prepared, be printed for circulation among the members in order that final action may be taken next year.

The President's Address, "The Need, Scope, and Character of Industrial Education in the Public School System," was delivered by Supt. L. D. Harvey, Stout Institute, Menomonie, Wis. He said in part:

"The central thought in the minds of most people, who are advocating industrial education is education for skill in industrial processes, but it must be very much more than this if it is to occupy its proper place in our educational system. Industrial education has for its purpose the acquiring of a body of usable knowledge of greater or less extent related to industrial conditions, processes, organization, and to the administration of industrial affairs, involving the gaining of some skill in the use of such knowledge and the securing of mental, aesthetic and ethical training through the acquisition and use of the knowledge indicated.

"Except very limited opportunities for instruction leading to skill in industrial processes, practically nothing has been done in this country for the development of industrial education outside the college or university. Material for instructional purposes in the entire field must be organized and put into teachable form and made available within the range of pupils' capacity for the thousands who now leave school at an early age with no training whatever directly fitting them for the activities of life in the industrial world where most of them will find their work. In the larger cities trade schools and continuation schools of various types must be organized. The scope and character of their work will be varied and must be adapted to local conditions. In rural communities secondary schools in which the study of agriculture and related lines of work is the dominant purpose must be organized. But when these different types of schools come into existence, even in considerable number, thruout the country the solution of the problem has just begun. For the great mass of those needing industrial education the existing public schools, elementary and secondary, must furnish the facilities. This means a modification of our present course of study, eliminating the non-essentials, and a broadening of the purposes of these schools. They must come to be more than merely preparatory schools for some higher school. They must recognize that the great majority of their pupils must earn their living by their hands and they must undertake to give definite instruction and training for at least the beginnings of industrial efficiency.

The Report of the Committee on Resolutions, Edwin G. Cooley, Boston, Chairman, contained the following paragraph: "Our system of State supported schools must include elementary schools, secondary schools, schools for the training of teachers, and State universities. The changed conditions of the twentieth century also demand the establishment of free schools whose purpose shall be the training of our youth for commerce and industry, as well as for the professions."

The officers elected for the ensuing year are: President, James Y. Joyner, State Superintendent of Public Instruction, Raleigh, North Carolina; Treasurer, Arthur H. Chamberlain, Throop Polytechnic Institute, Pasadena, Calif.; Secretary, Dr. Irwin Shepard, Winona, Minn.

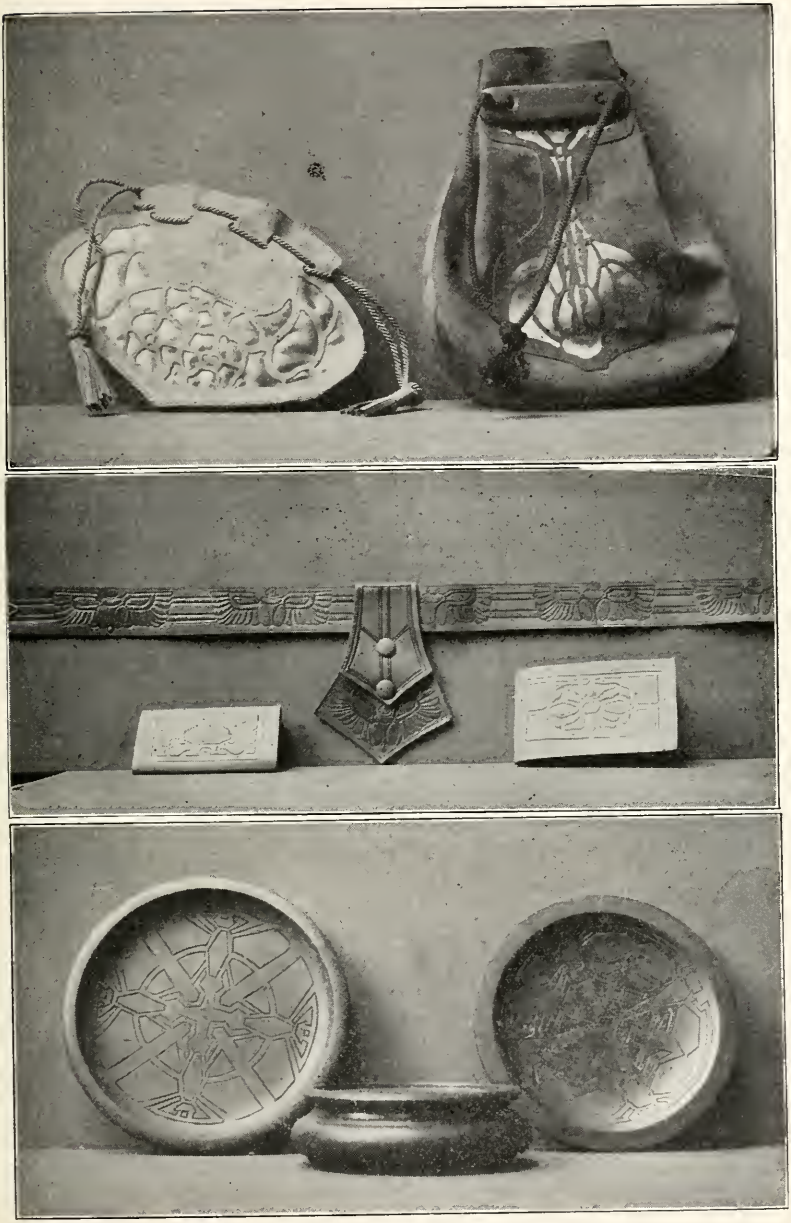
WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The sixteenth annual meeting of the Western Drawing and Manual Training Association was held at Saint Louis, May 4-7, 1909. There were several new features connected with this meeting that seemed generally to commend themselves.

In the first place, instead of holding all the meetings in one building they were distributed among the four high schools in different parts of the city. On Tuesday and Thursday evenings the meetings were held at the Central High School, on Wednesday morning at the Yeatman High School, on Thursday morning at the McKinley High School, and on Friday morning at the Manual Training School of Washington University. Exhibits of school work were prepared in all of these buildings.

The sessions closed at one o'clock, at which time lunch was served to members of the Association. The afternoons were left free for study of the buildings, the equipments and the exhibits.

The general plan made it convenient for visitors to Saint Louis to visit all



FROM THE EXHIBITS AT THE SAINT LOUIS MEETING,
WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.
LEATHER WORK, CLEVELAND, OHIO, HIGH SCHOOL.
WOOD TURNING, MINNEAPOLIS.

of these schools somewhat leisurely without the necessity of deserting a meeting for the purpose. To some of the members it seemed open to the objection of minimizing the attention given to the out-of-town exhibits and the commercial exhibits, which were installed in the Central High School building.

During the last few years the commercial exhibits have shown a decided development both in extent and in educative value. They are coming to be looked upon by progressive workers in the fields of the manual arts as one of the important features of the annual meeting. If a supervisor of drawing or manual training were to take a trip to Chicago or Saint Louis for the special purpose of studying the latest developments in equipment, materials and supplies, and the latest books, magazines, and other literature, it would take several days of hard work to accomplish so much as is possible at one of these exhibits in as many hours.

The school exhibits, while not so extensive as they have been in some previous years, were very good and well repaid careful study.

The development of a variety of interests and lines of work among the members of the Association was strikingly in evidence at the Saint Louis meeting. The number of so-called "Round Tables" was increased to seven, and included: Related Courses in Art, Manual Training, Household Arts, Related Courses in Art and Manual Training, Art Instruction in Universities, Manual Training and Trade Schools, Related Courses in Art and Household Arts. In addition to these there is an active committee on the "Manual Arts in Normal Schools."

At all of these Round Tables there was goodly attendance and animated discussions. Indeed the Editorial Board was formally requested not to publish a full report of the proceedings at one round table.

The Association has never been divided into sections or departments, and future executive committees are hardly likely to recommend such division. The experience of the National Education Association along these lines should be sufficient for the smaller associations. It is possible for a program committee to provide too many interesting things at the same time.

THE HOUSEHOLD ARTS.

A good deal of enthusiasm was displayed at the three sessions devoted to various phases of the Household Arts. At one of these sessions Dr. Edna D. Day, Department of Home Economics, University of Missouri, Columbia, read a paper on "The Socio-Economic Value of Domestic Art in the Education of Future Home-Makers."

On Thursday evening the Association listened to an address by C. Howard Walker, the architect, of Boston, on "Art in Education."

The other evening address was by Director Walter S. Perry, Pratt Institute, Brooklyn, on "India: The Life, Religion and Art of the Hindus, Buddhists and Mohammedans." The address was illustrated by a fine collection of colored stereopticon slides, and no adequate report can be given here.

The first half of the Wednesday morning session was occupied by three round tables.

The morning closed with a general session, at which Ernest A. Batchelder, Pasadena, Cal., gave an illustrated address on "The Study and Practice of Design;" and Miss Lucy S. Silke, Chicago, presented a paper on "Color Training in the Schools." Miss Silke divided her subject into three sub-topics: 1st, as to the technic of color from the pupil's point of view; 2nd, as to courses of study in color; and, 3rd, as to methods and materials.

The first half of the Thursday morning session was devoted to three round tables. The topic for the general session was "Manual Training and Trade Schools," ably presented by Dr. C. M. Woodward, Saint Louis, and Charles F. Perry, Director of the Milwaukee Trade School.

The Friday morning session was given up to a study of various phases of the household arts problems, and to the annual business meeting.

The treasurer's report showed the finances of the Association to be in splendid condition. The report of the committee on exhibits indicated a waning interest in the traveling exhibits. Upon the committee's recommendation the traveling exhibits are to be discontinued for a year. The committee on entrance credits reported the action of the North Central Association of Colleges and Secondary Schools in recommending a credit allowance of two units for high school work in freehand drawing and applied art. The report of the committee on the manual arts in Normal Schools was, by vote of the Association, ordered reprinted in pamphlet form for free distribution. The report of the Editorial Board showed that there was a prospect of early publication of the annual report. The report was published and mailed to members on June 23rd. Copies of the various reprints that are available for free distribution, or of the annual report at the usual price, may now be obtained from the chairman of the Editorial Board, Ira S. Griffith, Oak Park, Illinois.

The officers for the new year are: President, Robert A. Kissack, Yeatman High School, Saint Louis; Vice-President, William T. Bawden, Normal, Illinois; Secretary, Miss Bertha L. Patt, State Normal School, Cedar Falls, Iowa; Treasurer, George M. Brace, Menomonie, Wis.; Auditor, Fred D. Crawshaw, University of Illinois. Urbana. Minneapolis was chosen as the place of meeting for 1910.

EASTERN ART TEACHERS' ASSOCIATION.

EASTERN MANUAL TRAINING ASSOCIATION.

Very successful and profitable meetings of these two Associations were held in Pittsburgh on Thursday, Friday and Saturday, May 6-8, 1909. At some of the sessions in Carnegie Music Hall the two Associations were united. The most important events of the series of meetings was the amalgamation of the two Associations, which was finally effected after several years of discussion pro and con.

After an organ recital by Charles Heinroth, which opened the session, S. C. Jamison, president of the Central Board of Education, welcomed the delegates on behalf of the city. Addresses were delivered by John Morrow, superintendent of the Alleghany schools, and D. B. Oliver, president of the Northside Board of Control.

Frank M. Leavitt, president of the Eastern Manual Training Association, spoke in behalf of that Association, expressing his belief that "Crafts and Arts" could and would be successfully combined. Pittsburg, he said, was a particularly appropriate place for a meeting of this kind, for in no other city in the country were art and industry so closely linked.

Mrs. M. E. VanWagonen, president of the Eastern Art Teachers' Association, replied to Mr. Leavitt's address.

Arthur A. Hammerschlag, director of the Carnegie Technical School, gave a most interesting address on "The Influence of Arts and Crafts on Education." He called attention to the fact that art is the oldest of the three. He said:

"Nature was beautiful long before man's hands wrought the crudest materials of craftsmanship; in like manner, craftsmanship is considerably older than education. But it is art that is the oldest and most important of them all. Man does not struggle to accumulate wealth for the mere love or greed of gold, but in order that he may buy and surround himself with beautiful things; the two are inseparably linked together; art is the great medium whereby we express our best and highest thoughts. In Europe education, crafts and arts have have always been a part of each other.

"This state of things is rapidly coming to pass in America, and especially in Pittsburg where a splendid example of a successful unison of the three may be found in the Carnegie Technical Schools."

An interesting display of the manual training work of various schools included architectural work, designing, mechanical drawing, woodwork, basketry, cooking, etc. The most notable showings were made by the Girard College Manual Training School of Philadelphia, the Pratt Institute of Brooklyn, the Sloyd Training School of Boston and many of the Pittsburg and Allegheny institutions.

Some of the papers read were: "Progressive Drawing," by Langdon S. Thompson, Jersey City; "Better Grammar Grade Provision for the Vocational Needs of Children Destined for Industrial Pursuits," by Alvin E. Dodd, Boston; "Manual Training in Elementary Schools is Industrial Training," by Daniel Upton, Buffalo.

The principal speakers Friday in the Music Hall were Samuel Hardin Church, Henry Turner Bailey, editor of School Arts Book, and Dr. Samuel Hamilton, superintendent of the Allegheny County Schools. Mr. Church, whose talk was "Art for the People," encouraged those who were making a study of it to stick to the old masters. Mr. Bailey's address was on the "Inter-Relations of Drawing and Making." He explained the fact that one could not exist without the other—that all the expert craftsmanship in the world originated from a single little drawing.

At the evening session of the manual training teachers two interesting addresses were given by Dr. Herman Schneider, dean of the College of Engineering, University of Cincinnati, and James F. Barker, principal of the Technical High School of Cleveland.

On Friday evening a reception was given the delegates at the Hotel Schenley by the Congress of Women's Clubs of Eastern Pennsylvania. The reception was held in the parlors and was followed by a musicale in the ballroom.

Special cars carried the delegates and visitors from the Carnegie institute after the formal session at 4:30 o'clock, to the Homestead steel mills, many more taking the trip than was at first expected. Consqeuently special street cars were substituted for the automobiles at first planned. A tour of the mills was made, the party returning to the city in time for dinner and the reception and musicale in the evening at the Schenley.

The managers of the Pittsburgh and Allegheny Free Kindergarten Association and the alumnae association of the college, received in honor of the members of the two visiting associations from 4 o'clock until 6.

A committee consisting of Miss Helen Livingstone, Miss Harriet Eck, Miss Irene McDermott of Pittsburgh, and Mrs. Williams and Mrs. Van Dusen of Cleveland was appointed by the Manual Training Association to present an outline of a new course of work in manual training at the next convention, the new course to bring about a more uniform standard of work in the schools, thus securing only grammar school work in the grammar schools and high school work in the high schools. The plan is to be elastic enough to meet the different conditions of living in different localities, in the poor and congested sections work being given which will be of benefit to those in such districts, while another adaptation of the work will be made for those in different environment.

The officers elected were as follows:

President, Henry T. Bailey, Boston; vice president, Arthur Dean, Albany, N. Y.; secretary, Miss Eva Struble, Newark, N. J.; corresponding secretary, Miss Ada Williams, Cleveland; treasurer, Charles McGregory, Brooklyn; secretary of transportation, Joseph M. Tilden, Brooklyn; editor, C. L. Boone. Montclaire, N. J. Executive committee: Mrs. M. E. Van Wagonen, Pittsburgh; Alfred P. Fletcher, Rochester, N. Y.; Walter S. Goodnough, Brooklyn; Miss Harriet Condon, South Manchester, Conn., and A. D. Alexander, Pittsburgh.

MANUAL TRAINING TEACHERS OF SOUTHWESTERN OHIO.

A number of the manual training teachers of southwestern Ohio met at Dayton, Saturday, May 8th, to effect a permanent organization.

J. L. Lambert, director of manual training, Dayton, was elected President; Howard Carter, director of manual training, Hamilton, was elected Secretary-Treasurer. The Executive Committee is composed of the following: J. L. Lambert; J. H. Ball, director of manual training, Cincinnati; J. K. Lewis, assistant professor of drawing, Ohio State University; and L. H. Bugam, Piqua. This committee will select the place of the next meeting. The Association planned to meet twice a year.

The morning was spent in an inspection of the work and equipment of the manual training schools of Dayton. About 12 o'clock an excellent lunch was served at the Stivers' Manual Training High School by the wives of the Dayton manual training teachers.

J. L. Lambert, director of manual training, Dayton, gave the address of welcome. J. K. Lewis presented a paper on the "Value of Applied Design to Manual Training." He emphasized the importance of this oft-neglected part of the manual training work.

J. Bert High gave an address on "Shall we Organize?" He was heartily in favor of the organization of the manual training teachers of this section of Ohio.

Superintendent Darrell Joyce, of the Hamilton Schools, presented a paper on "The Relation of Manual Training to Grade Schools and High Schools." He emphasized the fact that manual training might be either cultural or vocational. He would postpone the emphasis on the vocational side of manual training until the last two years of high school. He objected to teaching the child what would probably be his life work too early in his school course, as he believed that this would have a tendency toward class division. The parents of the child would be more likely, in planning for the child's future, to select the craft of the father and thus start class division.

Charles F. Hoey gave an address on "The Importance of Free-Hand Drawing in Manual Training."

The teachers and school officials of Southwestern Ohio are very much alive to the importance of manual training. All the towns of any size in this section of the State are doing some work in this subject. F. C. Whitcomb.

NORTHERN INDIANA TEACHERS' ASSOCIATION.

The Northern Indiana Teachers' Association, which meets in April, usually enrolls from 2500 to 3000 teachers. Among the large and vigorous working Sections is that devoted to Manual Training. At the last annual meeting, with an attendance of about 250 at this Section, the following topics were discussed under the symposium: "Our Courses of Instruction: Their Essentials; Their Application." "Art," by Miss Alice E. Hall, Fort Wayne; "Domestic Science," by Miss Harriet M. Boulden, Huntington; "Shopwork and Drawing," by E. W. Boshert, Fort Wayne. The officers of the Manual Training Section for the new year are, President, W. Scott Hiser, Richmond; Secretary, Mrs. Mary L. Edson, Fort Wayne.

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At the last meeting of the Territorial Association of Teachers, of Arizona, a separate Section was formed of teachers of art, domestic science, and manual training, with an initial membership of about twenty. The president is Earl S. Curtis, Phoenix; secretary, Miss Frances Goodwin, Tucson.

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The Manitoba Manual Training Teachers' Association was organized in the latter part of May, at Winnipeg. The president is William T. Whiteford, director of manual training, Winnipeg.

CURRENT ITEMS

CLINTON S. VAN DEUSEN, Editor.

Teachers thruout the country have been invited by the United States Forester to co-operate with the Forest Service in an effort to obtain more definite knowledge of the characteristics of the most important forest trees of the United States. To do this it will be necessary to obtain a large number of volunteer observers who will collect material on the time of leafing, blossoming, and fruiting of the various kinds of forest trees. In his letter inviting the co-operation of the teachers, Forester Pinchot says:

"Knowledge of this kind is greatly needed and will be of value from the standpoint of both education and of practical forestry. For educational purposes the results obtained for each species, averaged and presented graphically by means of colored charts, will be available to all who are interested in the subject, and particularly to schools. They will form virtual "tree calendars," and will be valuable aids to nature study.

"Children can readily be interested in the actual work of obtaining records. This should form an attractive outdoor feature of the school work that should serve to develop the faculty of accurate observation, and at the same time to promote an interest in forestry which may lead to a better appreciation of its aims and methods. It may also prove to a be profitable addition to botany courses for older students.

"A study of this kind will be of great service in practical forestry, since the proper treatment of forests depends partly upon a knowledge of these characteristics of trees. For example, the time of the year at which a tree leafs out and blossoms is one of the indications as to whether or not it is frost-hardy in a given region, and the length of time a tree is in leaf influences the growth it is able to make during the season. Knowledge of the time when the seeds of each species ripen in various localities is of great value to those who are collecting seed, since seed often deteriorates or is eaten by squirrels and birds if not gathered and stored as soon as ripe.

"Another result of this study will be a more intimate knowledge of climate as manifested by plant growth, for differences in climate are shown by plant life as well as by instruments, and a preliminary idea can thus be gained as to whether a given region is suited to a valuable tree which it is desired to introduce there. Many such examples could be given, but sufficient has been said to show that the results of these observations will be a real help to practical forestry, in addition to their general interest and educational value. Volunteers will later be supplied with publications and charts containing the information they help to gather, as a return for the services rendered."

On request, the Forest Service will be glad to send forms upon which to record data and a pamphlet containing full instructions as to the nature of the observations and how they are to be made.

It is announced that Miss May Morris, daughter of the poet and artist Wm. Morris, will be in this country for a series of lectures on design and related subjects. Her intimate knowledge of her father's work and her own ability as a practical craftswoman should make considerable demand for her services. Her lecture subjects are; "Jewels," Medieval Embroidery," "Pageantry and the Masque," Historic Costume," "Design in Dress," "Symbols and Patterns," "Pattern Designing" and "Embroidery-Stitches." Miss Morris comes about the middle of November and any one desiring information in regard to her plans should write to Wm. B. Feakins, 23 W. 44th St., New York City.

H. G. McComb, a graduate of Stout Institute, is to be supervisor of manual training in a normal school in Porto Rico.

NORTH ATLANTIC STATES.

Charles L. Oswald, formerly director of manual training at Erie, Pa., is now director of manual training at Bangor, Me.

Miss Grace Gorsline of Oswego, N. Y. goes to Portland, Me., to teach industrial work in the Oral School for the Deaf.

Chas. O. Atwater has resigned his position in the Montclair, N. J., schools, and has accepted a similar position in the New Haven, Conn., schools.

MASSACHUSETTS.

Lewis H. Haight, instructor in machine work at Teachers College, has accepted a position in the New Bedford Industrial School.

Howard S. Harris, formerly at the Orthopaedic Industrial School, White Plains, N. Y., and Edgar B. Donaldson, a graduate of Bradley Institute, are two new teachers under M. W. Murray at Newton.

Howard H. Carroll, who was supervisor of manual training at Concord, N. H., last year, is now instructor of mechanical drawing in the Engineering Department of Harvard University.

Wm. D. McLemore of Mason City, Ill., is to have charge of manual training at Nantucket Island.

E. E. Goodell, comes from the position of director of manual training at Bangor, Me., to a similar position at Springfield.

NEW YORK.

Malcolm W. Schuler, a graduate of the manual training department of Teachers College, is one of the new instructors in shopwork in the New York public schools.

Geo. Morris, of Nantucket Island, Mass., comes to Syracuse as supervisor of manual training.

Miss Mary Lois Smith, will have charge of the manual training work in the school at Highland Falls this year.

E. M. Stanley has opened a manual training department in connection with a large private school at Glens Falls.

Miss Elizabeth Creighton is to supervise manual training in the public schools of Mt. Vernon, with Miss Bertha E. Brown as a new teacher in that line of work.

Miss Olive Bearss will teach elementary hand work in the public schools of Kingston.

S. Horace Williams who has been spending the last year at Teachers College, has been appointed supervisor of manual training at Glens Falls.

NEW JERSEY.

Trenton reports that they are introducing domestic science this year and have organized one new shop and that A. A. Doty, of Ohio State University, is teaching manual training at the high school and Milton E. Renner, of Trenton, has charge of the work in the grade center.

Edwin F. Judd, a graduate of Teachers College, has been appointed instructor in woodworking in the public schools of Montclair.

Miss Mary Geraghty, a manual training teacher of Newark, has been promoted to the position of assistant supervisor of manual training and will devote her time to the primary grades. Robert S. Collins comes from Saratoga, N. Y., to teach manual training in the same city.

Miss Estella Baker, formerly of the normal school at Ypsilanti, Mich., is to be in charge of the manual training department in the new normal school at Montclair.

Louis C. Butler has resigned his position in the St. Louis public schools and has accepted a position in Jersey City under Dr. Kent.

Miss Jessica Bagley, a graduate of the manual training department Teachers College, is to teach in the Newark public schools.

Albert F. Seipert comes from a position in the State Normal School at Maryville, Mo., to a position in grade shop work at Montclair.

PENNSYLVANIA.

Norman McDonald, of Watertown, N. Y., comes to a manual training position in the School for the Blind, at Philadelphia.

Miss Esther M. Howland, formerly in the Cleveland schools, is now teaching domestic science in the schools of McKeesport, Pa.

H. W. Small, a student in the Columbia Summer Session, has accepted a appointment at the State College. Mr. Small's work will include woodworking as well as some machine work and testing.

Miss Caroline Jenkins, who has been teaching manual training in the Oral School for the Deaf at Mystic, Conn., has resigned to accept a position in the Oral School for the Deaf, at Scranton, Pa.

Warren V. Hartz is to teach manual training in Reading.

SOUTH CENTRAL STATES.

The Louisiana State Normal School at Natchitoches has recently opened a manual training department with Geo. H. Jensen in charge. Mr. Jensen was formerly in charge of the Central State Normal at Mt. Pleasant, Mich., but during the past year has been attending Chicago University.

Chas. H. Dillon is in charge of the manual training work in the upper grades and high school at Duncan, Oklahoma.

TEXAS.

Houston reports that they are equipping a new machine shop, also three new manual art centers, one for white and two for colored children, and that Mr. Zeerpp, of Waterloo, Iowa, comes as assistant in the high school.

Carroll W. Angier, a graduate of Bradley Institute, is supervisor of manual training at Ft. Worth.

C. W. Arlitt, of Austin, Miss Anne George, of Denton, Miss Ella Westlake, of Peoria, Ill., Miss Margharetta Le Baron, of El Paso, and Miss Elizabeth Koger are new teachers of manual training at El Paso.

Manual training is to be started this year in Brownwood, with Fred McEachron in charge of the work.

NORTH CENTRAL STATES.

Edward R. Tompkins, of Bloomington, Ill., is in charge of the manual training work at Grand Forks, N. D., where considerable new equipment has been installed.

C. A. Brocus has taken charge of the manual training work at Minot, N. D.

Elles T. Marriott comes from the Manual Training High School of Indianapolis to teach manual training in the schools of St. Louis.

OHIO.

The Cleveland Technical High School, operated on the four-quarter plan, enabling pupils to complete a four year's course in three years, closed its first summer quarter September 3d. The result of this first experiment in regular summer high school work is interesting and instructive. About four hundred and twenty-five pupils were in attendance during the quarter. Of these nearly two hundred and fifty entered the first year immediately upon their graduation from the 8th grade in June. The quarter's work was excellent in all departments. The interest of the pupils is indicated by the attendance which averaged above 97%.

Carl T. Cotter comes from the position of director of Hackley Manual Training School at Muskegon, Mich., to that of supervisor of manual training at Toledo.

Edward Kurtz, of Olney, Ill., is to be supervisor of manual training at Sandusky.

William B. Dee has been promoted to the position of assistant director of manual training at Columbus, and Miss Anna S. Swainson, of the University of Missouri, has been appointed to supervise the primary hand work.

The following instructors have been added to the departments of Manual Training, Domestic Science and Art in the public schools of Columbus: W. R. Lockwood, O. M. Miller, Frances Beck, of Stout Institute; H. L. Clark and E. M. Christman of Bradley Institute; H. L. McCall, State Normal School, Oswego, N. Y.; G. A. Danskin of Thomas Normal School; and Roaline Schanfarber of the Ohio State University.

Miss Jessie Muir, of Port Huron, Mich., has been employed as instructor in drawing in the public schools of Middletown. This city has an elegant new high school building

Hemingway D. Shaw, formerly of Grand Rapids, Mich., has been appointed to fill a position in 7th and 8th grade bench work in Cleveland.

Sinclair Smith, of Mount Vernon, has charge of manual training in the Troy schools. A small amount of work under the regular teacher has been done in the past but Mr. Smith is the first manual training instructor to be employed.

The Manual Arts Department of Miami University, which has been giving two-year courses in manual training and public school art for several years, has been enlarged by the addition of a two-year course in the household arts. This combines domestic science and domestic art in a course for teachers. Miss Lena Ross, of Carthage, Missouri, a graduate of Pratt Institute, has charge of the work.

Miss Emma Francis, formerly of the domestic science department of Cleveland, is now teaching in the same line of work at Canton.

Miss Marguerite A. Rue, a graduate of Teachers College, is teaching handwork in one of the schools of Cleveland.

The Stivers Manual Training High School building at Dayton is now ready for occupancy. This is one of the finest manual training buildings in the State. It has been thoroly equipped with all of the latest appliances. Especial attention has been given to the machine shop equipment. Frank Stanton, of Muskegon, Mich., is a new instructor in woodworking.

Woodturning has been added to the manual training work in the schools of St. Mary. Burl Framton is the instructor.

Clive Reynolds, of Parish, N. Y., has been elected supervisor of manual arts at Coneaut.

W. C. Wilson has been employed by the Ohio State Normal College of Miami University, at Oxford, as supervisor and critic teacher in manual training in connection with their work in the public schools of that city; Miss Adelia Cone has been employed as instructor of drawing in the high school.

Miss Edna Dunham is teaching domestic science at Sandusky. She comes from a similar position at Cleveland.

INDIANA.

F. O. Belzer, who has been a grade school principal in Indianapolis, is now teaching 7th and 8th grade manual training in that city and Howard Hollenback, of Lochland, Ohio, has come to take the same line of work.

Harvey G. Hatch, who has been supervisor of manual training at Rockford, Ill., for several years, is now connected with the Interlaken School at La Porte.

Miss Dea Murray, of Oxford, O., is teaching drawing and handwork in the School for the Feeble Minded at Fort Wayne.

Ozro B. Badger, of Sullivan, is in charge of manual training at Columbus.

Miss Clara Potthoff, of Flora, has been employed as teacher of drawing in the schools of Gas City.

Miss Lucy L. Vaughn, formerly of Cleveland, Ohio, is now teaching domestic science in the schools of South Bend, Ind.

ILLINOIS.

Jacob J. Ritter comes from Fort Wayne, Ind., to accept the position of supervisor of manual training at Decatur.

Bertram Smith, who has been a teacher of manual training in Rockford for several years, is now a supervisor of manual training in that city and Homer Couch and Mr. Richie have been added to the force of manual training teachers.

A. P. Laughlin is the new supervisor of manual training at Peoria. He comes from Moorhead, Minn.

The school connected with the State Odd Fellows Home at Lincoln, Ill., has recently installed quite a complete equipment for woodworking and mechanical drawing with Harold E. Everley of Wenona, Ill., in charge.

Arthur F. Payne, of Columbus, Ohio, has accepted a position as assistant in the Manual Arts Department of Bradley Institute. He will teach classes in both woodworking and metalworking.

J. Scott Wiseman is to have charge of the manual training work in Kewanee.

Robert Craig has charge of the manual training work that has recently been started in Urbana.

Roseville is making a start in manual training in its high school with F. S. Cook in charge of the work.

MICHIGAN.

J. D. Bicknell has been promoted from his position as instructor in machine shop and forging to that of director of the Hackley Manual Training School at Muskegon and Wm. Rohr, Wm. Mann, Harry Garvey, Miss Anna Keeler and Miss Owen are new members of the same faculty.

Marion J. Sherwood, Miss Corabel Weimer and Miss Eleanor Temple of the manual training department of the schools at Grand Rapids, have each been granted a year's leave of absence for advanced study. J. R. Jensen, A. W. Hornung, Miss Mary F. Baldwin and Miss Bloomfield have been added to the force of manual training teachers in that city.

Harry G. Bower, of Sault Ste Marie, is now teaching manual training in one of the grade centers of Detroit.

Harry A. Jacobson comes from Muscatine, Iowa, to be director of manual training at Crystal Falls.

Grant R. Bonell starts his work as a teacher of manual training in the schools of Ironwood.

Manual training was installed this year at Negaunee, with Louis M. Roehl in charge.

WISCONSIN.

Geo. W. Clark who was at the Hackley Manual Training School, Muskegon, Mich, has accepted a position at Stout Manual Training School.

Max H. Bauman is teaching manual training in the schools of Madison this year.

Henry P. Gerber has accepted the position of supervisor of manual training at Stanley.

John Challoner succeeds Mr. Seidener as teacher of manual training at Mayville.

Chas. P. Kavanagh is teaching manual training this year at Antigo.

MINNESOTA.

C. A. Bowman, who taught manual training in the schools of El Paso, Tex., last year, is now supervisor of manual training at Stillwater.

Roland E. Chlonpek is an instructor of manual training in St. Paul.

The manual training work at Ely is in charge of Harvey K. Scharr this year.

Lymore L. Smith, a graduate of Teachers College, has been appointed supervisor of manual training at Hibbing.

IOWA.

Arthur R. Cram, who graduated last year from Stout Institute, is supervisor of manual training in Keokuk.

Edward T. Snively is supervisor of manual training at Fort Dodge.

Bristol E. Wing, of Muskegon, Mich., is now teaching manual training in one of the high schools of Des Moines.

Michael F. Kavanagh succeeds Harry A. Jacobson as supervisor of manual training at Muscatine.

Ward K. Snyder, of Oshkosh, Wis., is in charge of manual training in the upper grades and first two years of high school at Nevada.

Harlow G. Funselt is an assistant teacher of manual training in Chippewa Falls.

WESTERN STATES.

The State of California has established a Manual Training Normal School at Santa Barbara. The trustees have elected Miss Edna A. Rich president of the school and until a new building is provided the work of the school will be carried on in the buildings of the Blake Memorial School.

Of the sixteen credits required to enter the University of California, six are now allowed in manual training.

Rollin M. Marsden was elected as supervisor of manual training at Fullerton, Cal. and has directed the installing of the equipment for the work.

Miss Stella Shields, who graduated last June from Bradley Institute, is now teaching elementary handwork under Mr. Morgan at Santa Monica, Cal.

The manual training work at Billings, Mont., is in charge of Claude E. Inhart.

Earl R. Chalfant has taken charge of the manual training work at Douglass, Ariz.

CANADA.

D. Baxter who has been on the Winnipeg staff for two years has gone to British Columbia. His place has been taken by W. Beech of Manchester, Eng.

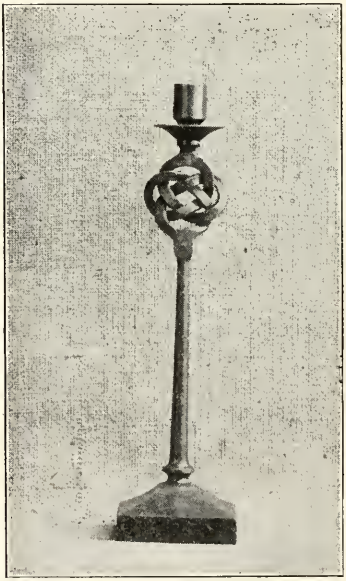
The new Collegiate Institute to be erected in Saskatoon, Sask., will contain a manual training department.

Nova Scotia, the proud boast of which province is that its educational system is equal to the best, took another step into the realm of advanced education on the 27th of last month when the doors of its new Technical College were thrown open to admit pupils. The new school is the natural outcome of the manual training system of the province and it is largely due to T. B. Kidner, formerly supervisor of manual training for Nova Scotia, and now supervisor of manual training in New Brunswick.

Professor Sexton, of Dalhousie College, Halifax, is principal of the college and director of manual training for Nova Scotia.

Some of the appointments to the staff are: T. S. Hewerdine, Lebanon, Ill., Professor of Civil Engineering; R. R. Keely, Edmonton, Alta, Professor of Electrical Engineering; G. F. Murphy, Halifax, N. S., Instructor in Mining and Metallurgy.

The Technical College is being conducted by the Government of the Province and the manual training system of the Province will be correlated with the new system of technical education so that the one will be a natural consequent of the other. Great results are expected from the operation of the new school, situated as it is in a province which is rich in industries and natural resources.



FROM THE FORGE SHOP,
ILLINOIS STATE REFORMATORY, PONTIAC.

SHOP PROBLEMS

GEORGE A. SEATON, Editor.

DESK AND BOOK SHELVES.

Both the desk and book shelves this month are from designs of W. E. Roberts, Cleveland. No divisions are shown within the desk lid but it would be well to divide this space up into pigeonholes suited to the needs of the owner. The desk lid hinges on the under side of the shelf, being thus held open by the projecting portion of the lid. A number of minor changes could be made in constructing the book shelves. The outline of the ends could be varied, the space between the shelves could be adapted to the books to be held, and a door might be added.

FIRE SCREEN.

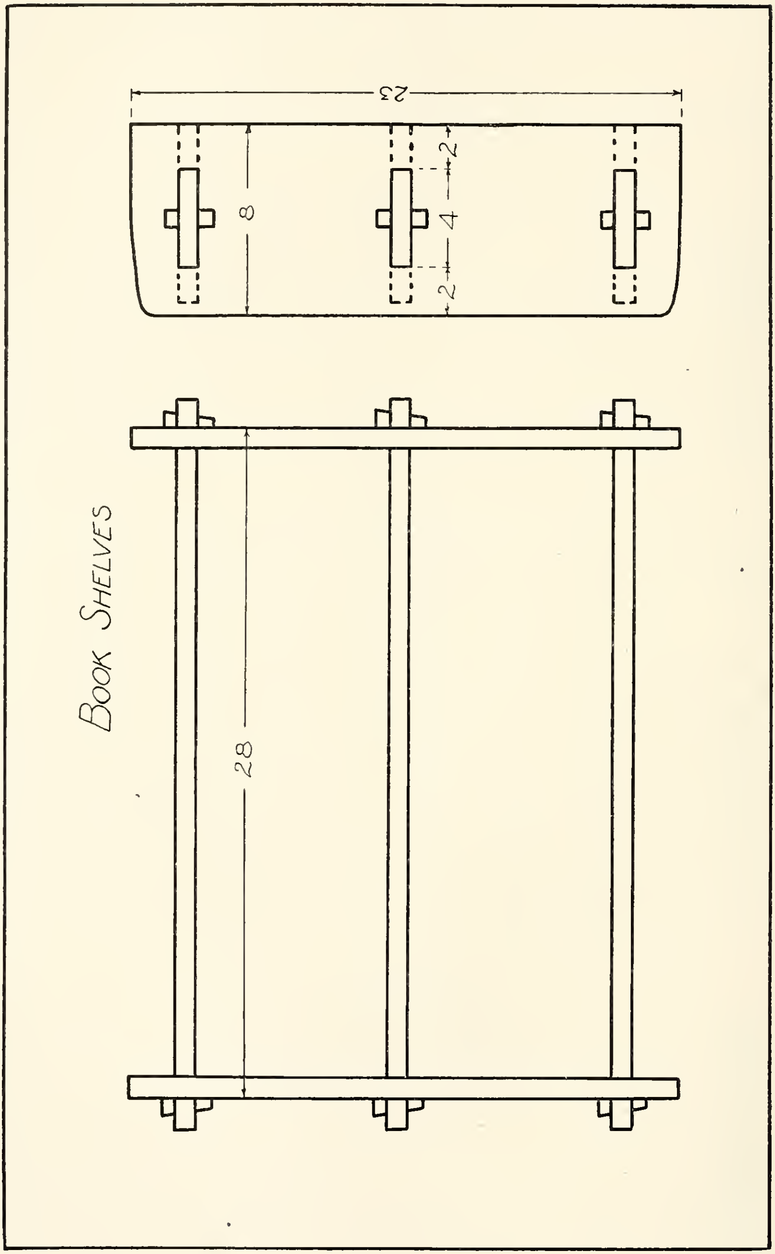
The working drawings show the frame work of a very simple but substantial fire screen from the designs of Hans Schmidt, St. Paul. No mention is made of covering material as this is left to individual taste.

WOODEN SPOON.

The wooden spoon finds a place in the majority of kitchens and it would be an interesting experiment to start the boys investigating along this line as it is surprising the various ways in which the making of this simple utensil has been solved. The one shown, which varies but a trifle from a stock design, is adapted to be made after the manner of a split pattern. The method of hollowing out the spoon will depend upon the school equipment and the ingenuity of the maker. In the majority of schools this task will have to be performed by hand with the gouge. A number of spoons of different designs may be made by a shifting of centers, the method of shifting producing a decided variation in the appearance of the spoon.

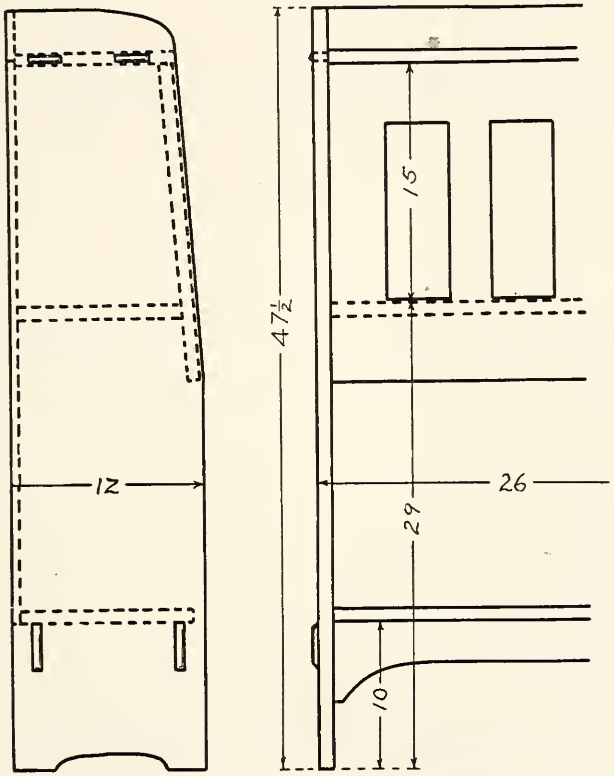
DOME

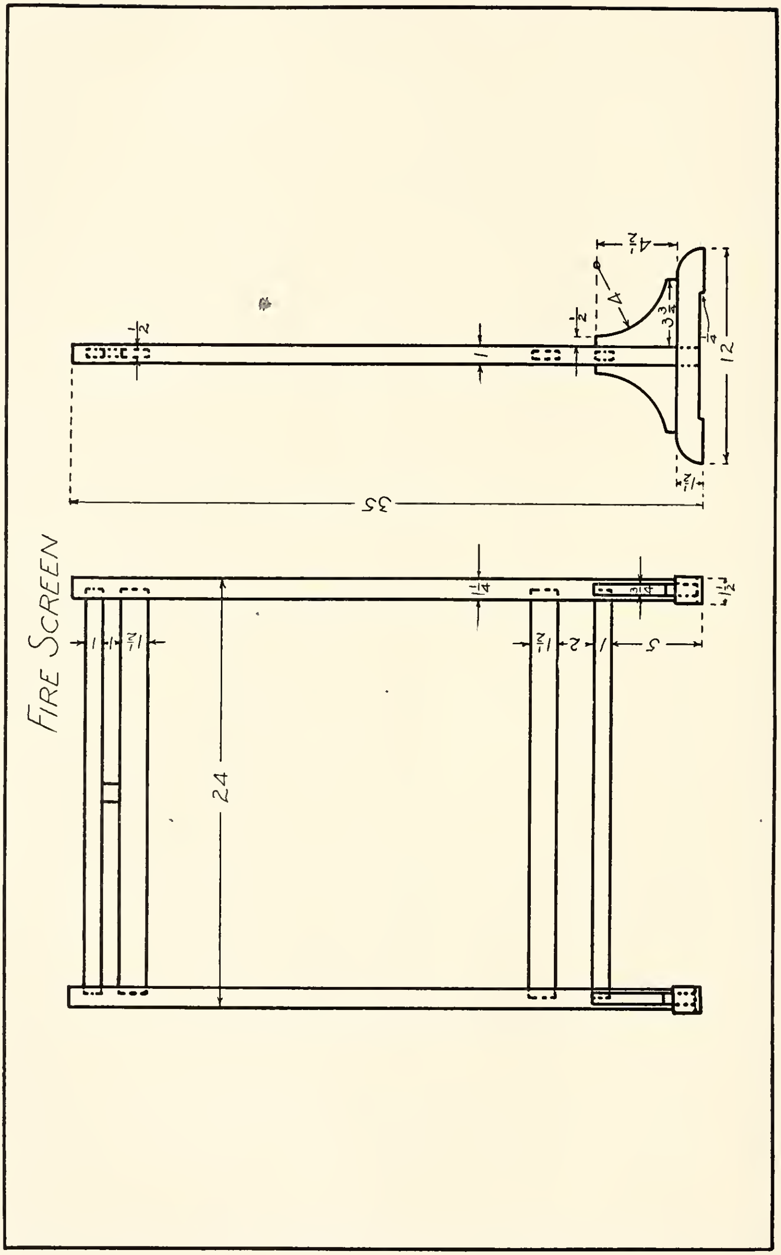
An attractive dome to be hung above the dining room table is shown in the drawings of Hans Schmidt, St. Paul. The first step in the construction of the dome should be the building of the lower frames. To this the cornice is then added without the brackets, the edges are trimmed to 22½ inches, and the whole then fitted, glued, and clamped. Screws, ¾ inch, No. 6, may be used to draw the corners well together. The heads should be sunk in the rabbets cut for the glass and stops. The top frames are to be made next and will have to be fitted mostly by trial as the angles are difficult to calculate and transfer to the wood. These frames may also be held together by screws and the upper frame attached to the lower frame in the same way. Before cutting the pieces for the cap of

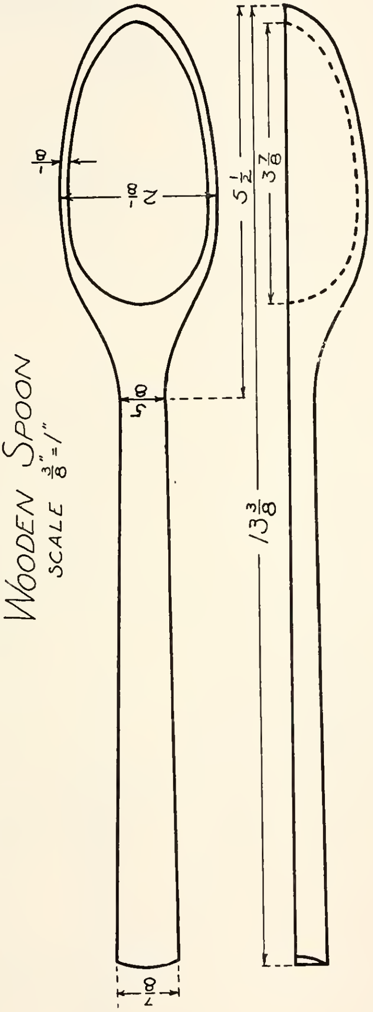

BOOK SHELVES

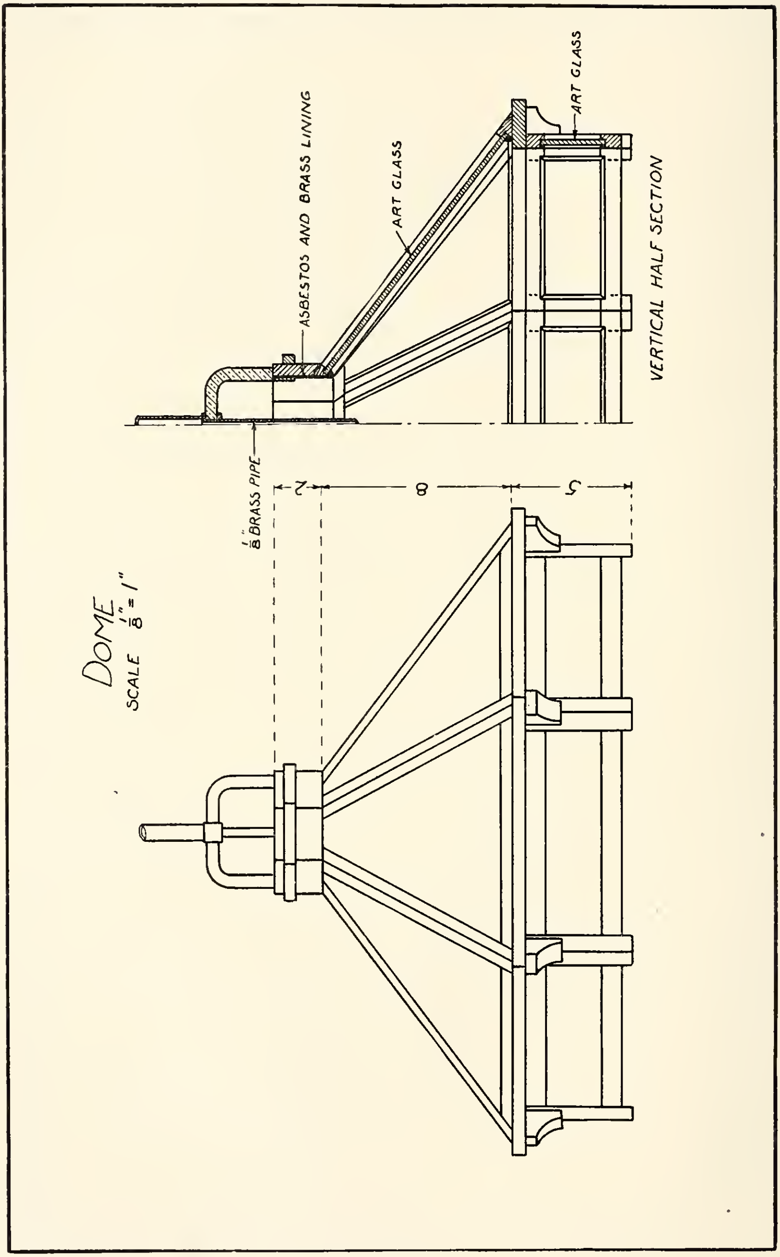
DESK

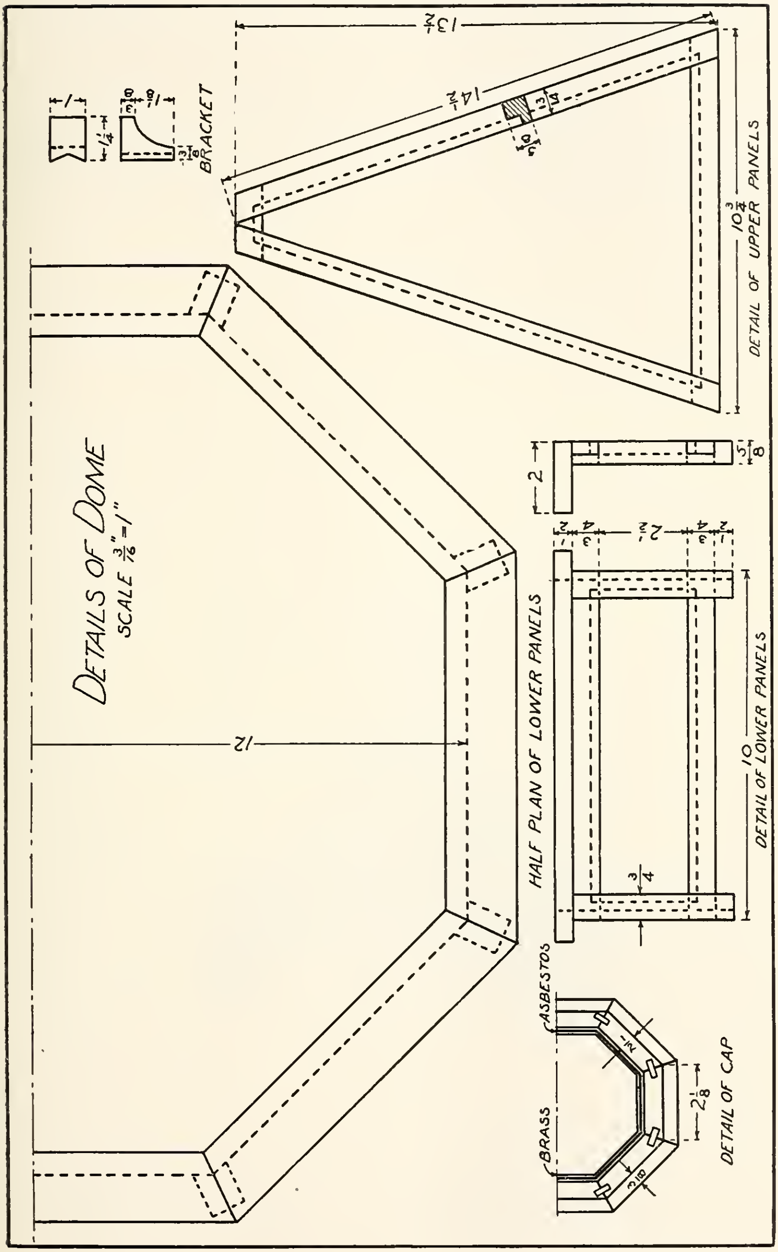
SCALE 1"=1'


12
47½
15
29
26
10

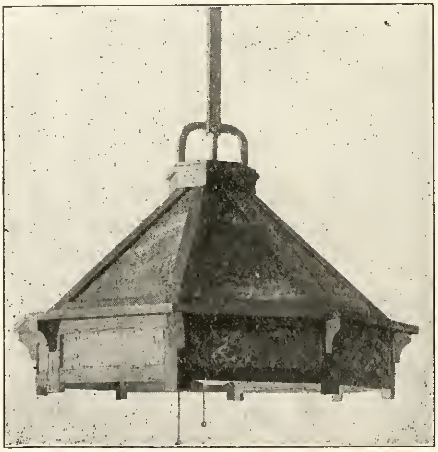

FIRE SCREEN
35
12
4
4 1/2
3 3/4
1/2
1/4
1
1 1/2
24
1 1/4
3/4
5
2
1


WOODEN SPOON
SCALE 3/8" = 1"
1/8
2 1/8
5/8
5 1/2
3 7/8
13 3/8
7/8


DOME
SCALE 1/8" = 1"
1/8" BRASS PIPE
ASBESTOS AND BRASS LINING
ART GLASS
ART GLASS
VERTICAL HALF SECTION
2
8
5


DETAILS OF DOME
SCALE 3/16" = 1"
BRACKET
1
1 1/4
3/8
DETAIL OF UPPER PANELS
13 3/4
14 1/2
10 3/4
3/16
12
HALF PLAN OF LOWER PANELS
2
5/8
2 1/2
3/4
DETAIL OF LOWER PANELS
10
ASBESTOS
BRASS
2 1/8
DETAIL OF CAP

the dome, the lower edge should be planed to the proper angle. As there is considerable strain on the cap, it should be keyed as shown in the details. In order that the weight may be distributed more evenly, it is best to line the cap with brass and extend the lining down far enough so that it may be screwed to the inclined frames as well as to the cap and the supporting brass stirrup. If the dome is to be used with gas it will be necessary to include the asbestos lining, though this may be dispensed with in case electricity is used. After the dome is stained and finished the glass is put in and held in place with stops $\frac{3}{16}$ by $\frac{3}{16}$ inches.



REVIEWS

L'Education: An Illustrated Quarterly Review of Home and School Education. Edited by M. G. Bertier, director of the Ecole des Roches. Published in March, June, September, and December, by Vuibert and Nony, 63 Boulevard Saint-Germain, Paris. Subscription rates: 6 fr.; foreign, 6 fr. 50; single number, 2 fr.

The first two numbers of volume one, March and June, 1909, have been received. Each number is a pamphlet of about 160 pages, 6¾ by 10 inches. The plan of the Revew is rather comprehensive. According to the prospectus which appears in the first issue each number will be divided into three parts: Part I. Original articles dealing with: *a.* Education of the child before school age, including such topics as hygiene and physical training, the work of the kindergarten, and the moral training of the young child. *b.* Education of the child during the years of school; school hygiene and physical training; physiological study of infancy; hygiene of food, clothing, and personal habits; games, sports, gymnastics, and manual training; psychological study of infancy and adolescence; methods of teaching; the fine arts, and school decoration; moral and social training. *c.* Continuation and completion of education after school. *d.* Modern schools and the progress of education. *e.* Studies of great educators. Part II. Educational news. Extracts and criticisms from the various journals; communications and correspondence. Part III. Bibliography. Reviews carefully written by competent critics, of the best educational literature published in French, German, and English, and occasionally other languages. Under the title "The Educator's Library" the Review proposes to publish critical analyses of those books recent and otherwise which seem to be most useful for reading and study by parents and teachers. Finally it will print unbiased opinions of books and magazines intended for children and youths.

Among other articles the March number contains: "A Lesson in Geology in Connection with the Recent Earthquake," by E. Caustier, and "The Teaching of Drawing," by Bertier and Storez.

The June number contains: "The Training of the Feelings," by Paul Gaultier; "The School and Social Progress," a translation of one of the chapters of "The School and Society," by John Dewey; "The Psychology of William James in the Service of Pedagogy," by E. Baudin; and "Professional Schools in Germany," by Victor Cambon.

This number contains also a review of a work entitled "American Methods in General and Technical Education," by Omer Buyse, curator of the Provincial Museum of Technical Education at Hainaut, and director of the Higher Industrial School at Charleroi, from which the following is taken:

"Do our schools meet the demands of present-day living conditions? Are the old methods of instruction in France, planned with only culture in view, suited to a modern democratic society, to an epoch of universal 'struggle for life?' . . . . . This is a question that is now being asked with insistence from all sides, and it is one that has not been satisfactorily disposed of. Never were so many pedagogic ideas put forth, never so many plans elaborated, so many programs changed, so many inquiries instituted, so many attempts made in all directions to put new life into educational principles; this whole movement attests the general conviction that there still remains something to be done and that certain necessary reforms have not been realized.

"In this search for the means of educational progress it is but natural to turn to one's neighbors: have they solved the problems that torment us? What profit may we draw from their experiences? . . . . .

"M. Buyse has carried his investigations to the United States and has brought back a rich harvest of suggestions. He went, not as an amateur tourist who repays by compliments the pleasant reception given him by some amiable superintendent, but as a well-informed and skilled investigator. He looked into details, he examined school statistics and programs, he took photographs, and observed the methods employed and the results obtained.

"It is true that he kept technical instruction especially in mind, but he has described practically the entire school system of the United States. 'In the life of a nation,' he says with much reason, 'all forms of education are found and all produce their effects. Nothing can be done to modify the results or the total action of the process of education unless appropriate modifications can be realized at every step in the school scale. That is why I have gathered my materials from every department of the public school system.' (p. 714) There are very few teachers who would not profit by some part of this voluminous work.

"The work is divided into seven parts. Part I. treats of elementary education, from 6 to 14 years. Part II. is devoted to secondary schools. Part III. Institutions for industrial education. Part IV. Schools for professional training. It treats of apprenticeship, whether in factories or in schools of various grades. Part V. deals with schools for the education of the Negro and the Indian. Part VI. Commercial education. Part VII. Higher technical schools having departments for mechanical, mining, and agricultural engineers, etc. . . . .

"The schools visited and described include, among others: kindergarten, Bronx, New York; the elementary schools of Newark, Boston, Montclair, and Washington; School of Education, Chicago; Carnegie Library, Pittsburgh; McKinley School, Chicago; high schools in Brooklyn and Boston; Pratt Institute, Massachusetts Institute of Technology; Sibley College; Stevens Institute . . . . The list is a long one but the profit from the reading is great. It is doubled by the great number of photographic illustrations. These show not only the exteriors of the buildings, but penetrate even into the life of the schools, showing the laboratories, the studios, the shops, and the work of the students. . . . Different methods of drawing and manual training are perfectly explained with the assistance of a great variety of models; the graduation of exercises is well indicated, from the childish construction of the kindergarten to the finished work of the higher technical schools." —W. T. B.

The Basket Maker. By Luther Weston Turner. Published by the Davis Press, Worcester, Mass., 1909. 9 x 6 in.; pp. 57.; price, 75 cents.

This is another beautifully made book in the same style as "Copper Work," by Rose. But the beauty is not all in the book-making; the designs shown in the many half-tone illustrations are fine. It is evident that Mr. Turner knows how to use a good camera and how to arrange his material so that it illustrates a process effectively. But best of all, he believes that basketry as well as woodworking and metalworking must be done intelligently and thoroughly in order to be of educational value. He says that "the one great aim of manual training is to combine judgment, a purely mental function, and execution, a purely physical one," and he finds "no work so efficient in combining the two from the beginning as basketry." It is evident that he puts more thought and more accuracy into basket making that we sometimes find in schools. For that reason Mr. Turner is a safe guide, and his book will help to raise basketry to a higher plane as a medium of training and expression in school work. —C. A. B.

Box Furniture. By Louise Brigham. Published by The Century Co., New York, 1909. 7¾x5¼ in.; pp. 304; price, $1.60, net; postage, 14 cents.

This book shows in a most attractive way the possibilities of constructing furniture out of packing and other boxes which may be puchased in any city at a very low price. There are over a hundred illustrations, each showing a different possibility. The designs show great ingenuity and an appreciation of good proportion. Indeed the drawings, which are by Edward H. Ascherman—especially the fifteen interiors, are so alluring that one almost feels that he would be willing to live in box furniture surroundings for the rest of his life. But when he brings to bear his knowledge of construction he realizes that many of the more elaborate pieces are far from good in construction, tho they may may serve well for camp or temporary furniture. From the manual training standpoint, then, the book is valuable as suggesting many simple or type forms of furniture, but, with the exception of some of the smaller pieces, the book does not show "good construction." It suggests many good things to make, but does not suggest the best way to make them if one has at his disposal a pile of good lumber. However, the book fills its main purpose admirably, because it tells how to do some remarkable things with boxes, and inspires one to try his hand at making simple furniture. —C. A. B.

School Knitting. By Mary A. McCormack. A. S. Barnes & Co., New York, 1909. 7½x5 in.; pp. 73; price, $1.00. This book shows the possibilities of an empty spool, a few pins and plenty of yarn when deft little fingers use them. On each left-hand page is a half-tone of some object to be made; on the opposite page the process of making is described. Most of the pieces are the right size for a doll's wardrobe—hood, jacket, bootees, skirt, sweater, carriage robe, hammock, etc.

A B C of Philosophy. By Grace F. Landsberg. Published by R. F. Fenno & Co., New York, 1909. 7½x5 in.; pp. 147. A classification of schools of philosophy and a brief text on the world's greatest philosophers and their theories.

Mission Furniture: How to Make it—Part I. Published by Popular Mechanics Co., Chicago, 1909. 6¾x4¾ in.; pp. 94; price, 25 cents. This little book contains working drawings, photographs, and directions for making nearly twenty pieces of furniture ranging from a tabouret to a roller-top desk. These have appeared from time to time in *Popular Mchanics* and now are gathered into book form. The author's name is not given, but it is evident that the book was written by a man who knows how to present such details as are needed by students.

Machinery's Reference Series. A series of pamphlets, each one a unit in a complete library of machine design and shop practice, revised and reprinted from *Machinery.* Published by the Industrial Press, New York. 6x9 in.; 32 to 56 pp. each; price, paper, 25 cents each to subscribers to *Machinery.*

No. 5. *First Principles of Theoretical Mechanics.* By Lester G. French, presents the subject in a way to show the relation between theory and practice.

No. 11. *Bearings.* Contains: The Design of Bearings, by Forrest E. Cardullo; Causes of Hot Bearings, by E. Kistinger; Alloys for Bearings; Ball Bearings; and Friction of Roller Bearings, by C. H. Benjamin.

No. 12. *Mathematics of Machine Design,* with special reference to shafting and efficiency of hoisting machinery, by C. F. Blake, contains: Machinery Shafting, and Efficiency of Mechanism.

No. 14. *Details of Machine Tool Design,* contains: Elementary Principles of Cone Pulleys and Belts, by L. Cheney; Cone Pulley Radii, by John J. Harman; Strength of Countershafts, by Frank B. Kleinhans; Tumbler Gear Design, by John Edgar; Faults of Iron Castings, by Forrest E. Cardullo, and Proportions of Machines Built in a Series of Sizes, by Stanley H. Moore.

No. 17. *Strength of Cylinders,* contains: Hydraulic Cylinders—General Principles; Formula for Strength of Thick, Hollow Cylinders, by John H. Cooper; Design of Thick Cylinders, by T. A. Marsh; Charts and Diagrams for the Design of Thick Cylinders, by John S. Holliday and John S. Myers; and Bursting Strength of Cast Iron Cylinders, by C. H. Benjamin.

No. 18. *Shop Aritmetic for the Machinist,* by Erik Oberg, contains: Figuring Tapers; Setting Over Tail-Stock for Taper Turning; Cutting Speeds and Feeds; Trains of Gears; Lathe Change Gears; Speed of Pulleys; Indexing Movements for the Milling Machine; Change Gears for Milling Spirals; Square and Square Root; Use of Formulas; and Use of Tables of Sines, Cosines, Tangents and Cotangents.

No. 19. *Use of Formulas in Mechanics,* contains: General Remarks on Self-Education, by C. F. Blake; Mathematical Signs and Expressions, by C. F Blake; Strength of Materials, by C. F. Blake; Graphical Methods of Solving Problems, by C. F. Blake; Principle of Moments as Applied to the Lever; and The Center of Gravity, by Benj. F. LaRue.

No. 20. *Spiral Gearing,* contains: Calculating Spiral Gears, by E. H. Fish; Rules and Formulas for Designing Spiral Gears, by Ralph E. Flanders; Diagrams for Designing Spiral Gears, by Francis I. Bostock; Comparison of Efficiency of Spiral Gears, by Ralph E. Flanders; and Setting the Table when Milling Spiral Gears, by Walter Gribben.

No. 22. *Calculations of Elements of Machine Design,* contains: The Factor of Safety, by Forrest E. Cardullo; Working Strength of Bolts, by Forrest E. Cardullo; Flange Bolts, by John D. Adams; Formulas for Designing Riveted Joints, by Franklin A. Smith and A. Wind; Calculating the Strength of a Mouthpiece Ring and Cover, by Ralph E. Flanders; Keys and Keyways; and Toggle Joints, by Lester G. French.

No. 23. *Theory of Crane Design,* contains: The Design of Jib Cranes, by R. W. Valls; Examples of Jib Crane Calculations, by Dyer Smith and Ralph E. Flanders; Calculations for the Shaft, Gears, and Bearings of Crane Motors, by George J. Leire; and Force Required to Move Crane Trolleys, by John S. Myers.

No. 24. *Examples of Calculating Designs,* contains: Charts in Designing, by John S. Myers; The Designing of Machine Frames, by E. A. Fessenden; Bending Stresses in Wire Rope, by James F. Howe; and Design of Billet and Bar Passes, by B. H. Reddy.

Nos. 27, 28, 29 and 30. *Locomotive Design,* by Geo. L. Fowler and Carl J. Mellin takes up the calculations for Locomotive Design in detail.

These pamphlets present their subjects in a way that is most helpful to practical designers. The text in each case is fully illustrated and presents an attractive, clear-cut appearance. Methods for solving problems are in each case illustrated by the full solution of some typical example.

Those who have been accustomed to using complicated formulas in figuring proportions of machine parts will find that their work can be greatly simplified by studying the graphic methods and charts presented in these pamphlets. The graphic method presented in *The Designing of Machine Frames* should be of general interest as it is a method for calculating the strength of any piece of a construction that is subject to bending, regardless of the shape of the piece. This method can be used by any one who knows arithmetic and can use drawing instruments.

Bearings should be read by everyone who has the care of machines.

—F. H. EVANS.

The following have been received and will receive more extended notice in a later issue:

Mechanical Engineering and Machine Shop Practice. By Stanley H. Moore. Hill Publishing Co., New York. Price, $4.00 net, postpaid.

Freehand Perspective and Sketching. By Dora Miriam Norton of Pratt Institute, Brooklyn, N. Y. Published by the author. Price, $2.25.

Modelling in Public Schools. By Walter Sargent. Published by J. L. Hammett Co., Boston.

Craftsman Homes. By Gustav Stickley. Published by The Craftsman Publishing Co., New York.

Nature's Aid to Design. By Louise W. Bunce and E. S. D. Owen. Published by John Lane Company, New York.

The following have been received:

The Technical High School, Cleveland, Ohio. A twenty-page pamphlet describing building and equipment and outlining the course of instruction.

Observations on the Schools of Great Britain, Belgium and Germany. Made by a committee of Pittsburg teachers during a tour under the auspices of the National Civic Federation.

Report on Manual Training. By the superintendent of public schools, Reading, Pa. This report is the result of an investigation of local needs and what is done in other cities, and covers recommendations for a complete scheme for the city, including an elementary industrial school for boys from fourteen to sixteen, a trade school for older boys, and evening trade work. It also summarizes what is being done in many other cities.

The Langdon Design Stamps. By Dr. Langdon S. Thompson. Published by The Witter Company, New York. Price, 25 cents. This book describes the teaching of design by means of rubber stamps.

Bulletin No. 9. National Society for the Promotion of Industrial Education. Proceedings of the second annual meeting of the Society held at Atlanta, Georgia, Nov. 19 to 21, 1908. A valuable report to one who is interested in the recent discussions on industrial education.

Industrial Education. An address by Samuel P. Orth at the dedication of the Cleveland Technical High School. Printed by the Technical High School Printshop, Cleveland, Ohio.

Preliminary Report on Simplified Course of Study. By William H. Elson, superintendent of public schools, Cleveland, Ohio. This includes a discussion of the development of the course of study in the Cleveland elementary schools, opinions of it by representative citizens and school principals, simplification by elimination, by selection of topics, by revaluation and by correlation, conclusions and recommendations

School of Household Arts. First annual announcement of this new division of Teachers College, New York City. This school will prepare teachers of the household arts and professional workers in household management and its allied fields. With its excellent new building and equipment, and its strong faculty it is now prepared to do a great work.

A Primer of Forestry. Part I. Practical Forestry. By Gifford Pinchot, Farmers' Bulletin No. 358, published by the U. S. Department of Agriculture, Washington. A forty-eight page pamphlet with twenty-five illustrations. This is a re-publication of Part II of Bulletin 24 of the Forestry Service which appeared in 1905.

VOLUME XI. NUMBER 2.

MANUAL TRAINING MAGAZINE

DECEMBER, 1909

BETTER GRAMMAR GRADE PROVISION FOR THE VOCATIONAL NEEDS OF THOSE LIKELY TO ENTER INDUSTRIAL PURSUITS.[1]

ALVIN E. DODD.

IN the minds of many this title may appear to sum up the great modern industrial heresy. To the orthodox scholastic, vocational training is bad enough; but to suggest that the vocation is industry, and the place to give this training is in the elementary schools, is to sum up the evils of the present educational movement.

It may, however, be well to draw attention, for a moment, to the fact that in all nations and in all ages educational systems have been vocational. They have provided definite preparation for the future life and occupation of the pupils by expressing the ideals of the people. If the ideal is beauty and strength of body as in Greece, athletics has a place in education. If the idea is skill in arms and conquest by war, as in Rome, military training is the means of education. Where wisdom in council has been the ideal of life, and the traditions of the people the ideal source of wisdom, school children have spent their time conning the records of the deeds and sayings of the forefathers. In the Middle Ages, knowledge of the classics was the ideal for church and monastery, and classic literature was the sole means of education. If the ideal come to be the transformation of raw material into products that contribute to the needs and comfort of man, handicraft will be the means of education.

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[1] A paper read at the Pittsburg meeting of the Eastern Manual Training Association, May, 1909.

AMERICA AN IMITATOR.

This country has been a great imitator. In literature, in art, in architecture, and in education, we have borrowed from all nations. We have lacked a definite ideal of our own and become confused in the heteregeneous mass of our borrowings. The schools of this country have been especially influenced by the methods of those schools which, in medieval times, were attached to churches and monasteries whose function was to teach boys to read and copy classical manuscripts, and to prepare for the priesthood.

The resulting forms of construction were easily made vocational for professional and commercial life, and this vocational trend appeared partly as effect and partly as cause of the professional ideal and later of the commercial ideal which has had a hold on the people.

At last this nation is coming to her own, and, in downright sincerity, daring to break with tradition and express her own life honestly. She is coming to recognize a two-fold ideal—not less definite because two-fold: industrial supremacy and perfected democracy.

INDUSTRIAL SUPREMACY.

Industrial supremacy is America's rightful ideal. She has boundless natural resources, ample facilities for transportation, inventive ingenuity, millions of capital, and industrial leaders of marvelous ability. But she suffers from one serious lack—widespread manual skill among her people. Industrial efficiency must be had. And this demand for efficiency is bound to find expression in a system of education supported by this people.

With few exceptions American elementary education assumes uniformity of course for all children through the eighth grade, approximately through the fourteenth year. Nowhere else in the world do we find similar practice. But it is well known that much more than a majority of the children in the public schools either do not complete the eighth grades or do not go beyond them, and all of these may be assumed to quit school as soon as the law allows. (It has been estimated that 80 per cent of the pupils in American city schools leave between the ages of twelve and sixteen.) European practice in all countries makes provision for extensive differentiation at twelve or earlier. The time is ripe to recognize the following facts: (a) Secondary education should involve differentiation according to educational need, and this begins to manifest itself earlier than the traditions of American education have established; in fact, after the sixth grade there should be allowed some opportunity for differentiation; (b) Whether or not we choose to call all of the courses thenceforward secondary or not, they should all be regarded as equal in the sense that each, for the class of children adapted to it, offers a first-class education, even tho some of these courses must terminate at the time when the pupils average fourteen.

Under the present system of education a large proportion of the boys and girls who leave school at about the age of fourteen, drift into unskilled or lowgrade work. The Report of the Massachusetts Commission on Industrial and Technical Education (April, 1906), states that 33 per cent of the children of this state who begin work between fourteen and sixteen are employed in unskilled industries, and 65 per cent in lowgrade industries; thus a little less than 2 per cent are in high-grade industries. This report concludes that:

> For the great majority of children who leave school to enter employments at the age of fourteen or fifteen, the first three or four years are practically waste years so far as the actual productive value of the child is concerned, and so far as increasing his industrial and productive efficiency. The employments upon which they enter demand so little intelligence and so little manual skill that they are not educative in any sense. For these children, many of whom now leave school from their own choice at the completion of the seventh grade, further school training of a practical character would be attractive and would be a possibility if it prepared for the industries. Hence any scheme of education which is to increase the child's productive efficiency must consider the child of fourteen.

Summing up the results of special inquiries at the leading textile centers of the state, the Massachusetts report says:

> That neither power nor advantage is gained by entering the industry at an early age; that the child who does enter closes behind him the door of progress to a fair living wage; that that child associates himself with our most undesirable population; that the work performed by the child is passing gradually to poorer and poorer classes of foreigners; that industrial education or education of any kind will mean that the children will not enter the industry. . . . . Those who at present do so depend, as a rule, on casual employment, become in many cases idle and discontented, are always on the verge of poverty, and are centers and causes of much social unrest.

NATURE OF COURSE.

A school course must be provided which will appeal to the vital interest of boys and girls from twelve to fourteen, who leave school in such large numbers from grade six upward, and who cannot enter a skilled trade before sixteen. Accordingly this work must be given in grades seven and eight, though it might well continue for a year longer, when special trade work might begin.

The Massachusetts report, previously quoted, groups the callings for which children and youth need special preparation into four classes—professional, commercial, productive, and domestic. As we have already said, the first two are provided for; the other two (apart from a few agricultural schools) are almost wholly neglected.

The course which follows is an effort to fill at least the bottom of this gap in our educational system where it appears in the upper elementary grades. It does not aim to afford preparation for any particular trade, but to cultivate intelligence, resourcefulness, manual skill, habits of industry and the appreciation of good workmanship. Such a course would remove academic prejudice against manual labor and so establish for the future worker a better attitude toward his work and greater happiness in performing it. By a certain amount of division of labor on the part of the pupils, and by the use of time sheets and cost sheets, an approach may be made to industrial or trade conditions.

Shopwork, wood	8	360
Printing, leather work, electricity, according to locality	4	180
Drawing, freehand and mechanical	5	225
Practical mathematics	5	225
English literature and composition	6	270
Geography and history	6	270
Hygiene and personal habits	1	45
	35	1,575

Sewing, hand and machine, simple garment making	6	270
Plain cooking and general housekeeping	6	270
Practical mathematics	5	225
English literature and composition	6	270
Geography and history	6	270
Design	4	180
Singing	1	45
Gymnastics and hygiene	1	45
	35	1,575

Shop work—		
Wood, benchwork and turning	8	360
Metal, bench work, choice depending on Gd. 7	4	180
Drawing, freehand and mechanical	5	225
Practical mathematics	5	225
English literature and composition	6	270
Civics	3	135
Business conditions and methods	3	135
Hygiene and personal habits	1	45
	35	1,575

Sewing, hand and machine, garment making, embroidery	6	270
Cooking (plain, invalid), housekeeping	6	270
Textiles—Design, domestic art	4	180
Practical mathematics	5	225
English literature and composition	6	270
Civics	3	135
Business conditions and methods	3	135
Singing	1	45
Gymnastic and hygiene	1	45
	35	1,575

The school day might consist of seven forty-five minute periods, beginning at 8:30 a. m. and ending at 4 p. m., with general exercises 9:00-9:15; fifteen minute recesses morning and afternoon, and a dinner interval from 12 to 1:30. If the course could be extended to three years the acadamic work in the third year should be similar to that above outlined, while the manual work should be specialized and elective, leading to particular trades.

Benchwork in wood is the basis of so many industries that it should be given in both seventh and eighth grades. With this should go some other industrial work. Choice of this second industry should be governed by the locality. At the North Bennett Street Industrial School printing has been found a very successful form of industrial work. In Boston there is a good trade school of printing located near us, and many opportunities for getting employment at more or less skilled work in printing. In a city like Brockton, Mass., however, where printing offices are few and the chief industry is shoemaking, leather would be a suitable material. In Lynn and Schenectady, where large electrical works are found, the study of electricity might properly be begun even in a seventh grade. A striking example of differentiation according to locality is to be noted in Pittsburg. In that city forging is successfully taught to eighth grade boys. This is probably beyond the strength of boys found in other localities.

In other nations and in our own until recent years, industrial training has been supplied by the homes, the guilds, and the apprenticeship system in the shops. Changing conditions in the home and shop have robbed our youth of this opportunity and it remains for the schools to make good the loss. Vocational training for commerce, law, medicine, engineering, and the teaching profession, is already provided by public education and it will not be long before a system of vocational training for trades will also be established in order that we may achieve the industrial supremacy which is ours by right of every other advantage, and which is relinquished to Germany because of her skilled workmen.

DEMOCRACY.

Democracy, it will be said, is no *new ideal* for this country. Quite true; but we are coming to a larger social vision and a larger interpretation of democracy. We have long proclaimed the equality of our citizens, but we are coming to see that equality must mean equal opportunity for self-realization, and that equal opportunity can be secured cnly by proper recognition of individual differences in native capacities and in social environment, and the requirements of vocational efficiency. When our attention is turned to these differences, there appears an urgent need for better provision for the vocational needs of children destined for industrial pursuits.

The first right of the individual, and the great essential for a better social order, is industrial efficiency, the ability to make the most of oneself and render the largest service to society, to produce more wealth and to raise the standard of living. As some on has said, "The very first element in a successful life, and the very first service of an individual to society, are the disposition, the determination, and the ability to make a living." Without this there can be no proper moral or esthetic life.

The economic and social ideals of the nation, then, unite in one powerful moulding influence of public opinion to alter the public educational system so as to provide vocational training for the trades.

WOMAN'S EDUCATION.

This is demanded for the girls as rightfully as for the boys. The question of women in industry is not a problem of the future. Women *are* in industry, here and now. For example, in Boston:

CENSUS 1909.

I.		
Women' clothing		1605
Women's clothing (factory)		1434
Men's clothing (factory)		1412
		4451
II.		
Millinery (factory)		263
Millinery (custom)		690
		953
III.		
Boots and Shoes		1038
Printing		1359
		2397
In skilled manufactories (I), (II) and (III)		7801
IV.		
Saleswomen		5136
Stenographers		2177
		7313
In skilled industry (I), (II), (III) and (IV)		15114
Unskilled industry—		
Tobacco	409	
Confectionery	1290	1699
Total		16813

Woman's present relation to remunerative employment in the United States is shown by two facts: 1. Of women over 10 years of age, 18.8 per cent were, in 1900, engaged in remunerative employment. Many believe that the coming census will show this to have increased to more than 25 per cent. 2. Of the 337 lines of employment for men and women listed in the last census, women had, in 1900, entered all but seven in greater or less numbers. Women are wage earners, then, already, and if men's training is to be considered, women's must be also. Many of these women, from necessity or from choice, enter industry very young.

In considering the forms of vocational training most suitable for women and girls, two points of view must be regarded as fundamental: woman's relation to self-support, and women's relation to the home.

WOMAN AND SELF-SUPPORT.

Says Benjamin R. Andrews:

> The time is believed to be not far away when practically every girl will learn a specific piece of remunerative skilled work, just as is expected of boys. This does not mean that married women will follow a vocation outside of the home save in exceptional cases. The American family will never encourage that. It *does* mean that girls generally will earn a livelihood in some skilled work for the three, six or eight years prior to marriage and will do so to their own good and the good of society; that this earning power will raise the standards of living in their parent's families, and give the impulse to a higher level when girls marry and start their own homes.
>
> It further means that this possession of skill in remunerative labor will, after marriage, afford protection and independence when families lose their male head. This is not so small an item as might at first be thought, when we consider that in this country one married woman in five is a widow and is responsible as was her husband, for her own support and usually that of children.

Of American women 65 per cent are married and to a degree responsible for a home and rearing of children. Material conditions have changed and the business of directing a home has become one of the most complex, as it has always been one of the most significant, of human tasks. For instance, the care and feeding of infants, involving milk modification, observation of conditions and the application of varying formulae, is a matter made plain only by instruction, which ought to be provided for every mother. In the North End of Boston, we feel this particularly, and much effort is made by district nurses and other agencies to supply this defect, but at the best the actual knowledge given is very limited in extent.

Somehow, opportunities for training in home management and all that that implies must be provided. Woman's educational needs from this partial vocational point of view are: 1. Vocational training toward self-support; 2. Preparation, incidentally in early years and directly when the need arises, for the duties that fall to the direction of a house.

AGE FOR BEGINNING VOCATIONAL TRAINING.

Concluding, then, that vocational training for industry should be provided for both boys and girls, it remains to consider at what age it shall be commenced and what form it shall take. Says Dr. Snedden:

INDUSTRIAL COURSES.

Benchwork in wood. Articles of practical household and school use progressively graded according to the difficulty of construction and the tools to be used. Trays, bookshelves, hat-, plate-, and towel-racks, foot-stools, chairs, tables.

Wood turning. As an interpretation of hand work in terms of modern commercial requirements.

Printing. The work should comprise a study of type case arrangement, use of forms and sizes of type, sentence spacing and construction, arrangement of type forms for the press, proof taking and reading, adjustment and operation of a foot power job press, composition and use of inks and papers, and care of rollers.

Electricity. Study of simple laws and principles of static and current electricity and magnetism, practice in the taking of electrical measurements with available commercial instruments. Principles of construction in motors, dynamos, and simple electrical machinery.

Sewing. Hand sewing, care and use of machines, taking of measurements, calculation of required amounts, costs of materials, mending, correct dressing, making of beds, correct dress for infants, children, making of dresses, cutting from patterns. Cooking outfits, napkins, curtains, pattern bags, towels, and garments necessary for carrying out principles.

Cooking. Sterilization, cooking of starchy foods, cooking of meats, use of proteid foods to the body, baking powder, methods of cooking, yeast, qualities of good bread, economy in buying and cooking, cost of living, planning simple menus, simple table service. Applications in cooking various articles of food, cooking and serving complete menus.

Housekeeping. Dust and its dangers, ventilation, sunshine, plumbing, sweeping, dusting, window washing, care of paint and other wood finishes, cleaning of metals, laundry work.

Textiles. Cotton, wool, silk, flax, growth or production, properties, manufacture, consumption, kinds of material, relative value.

Drawing, freehand and mechanical for boys. Simple mechanical drawing sufficient to enable making and reading of blue prints; quick, practical, freehand sketching; appreciation of and some practice in good design and its application to craft products and art printing.

Drawing; design for girls. Freehand sketching; study of color and color combinations; principles of design with reference to dressmaking, house-furnishing and embroidery and stencil patterns.

Practical mathematics. The arithmetic will contribute both knowledge and power which the pupil needs. Many of the mathematical notions with which the pupil has to deal will be gained directly from shop or work room experience, thus insuring clearer understanding and livelier interest. The instruction should aim at (1) accuracy and some speed in the fundamental operations, (2) power in simple mental calculation, (3) use of short cuts, (4) mastery of common fractions in the useful relations, (5) absolute mastery of the use of the decimal point, (6) facility in the practical application of tables of weights and measures in common use, (7) acquaintance with business forms and customs as found in stores, shops, banks, and on farms—taxes, mortgages, loans, insurance, (8) use of simple algebraic methods when feasible, (9) skill in straight thinking in the presence of complicated data.

English literature and composition. English literature will include the reading of the best pieces of literature for appreciation but without elaborate analysis. English composition will provide much practice in writing business forms including letters of all kinds, also theme writing for practice in simple, direct expression of ideas definitely formed thru experience. There should also be discussion of magazine articles and current events, and occasional debates.

Geography. In geography emphasis should be laid upon the relation of man to nature—distribution of raw materials, facilities for using and transporting these materials, resulting economic and social differences in communities. This would lead naturally to the great historic issues in

United States History and history will be seen to be not a series of dates of wars, or the development of political theories apart from the life of the people, but the working out of vital questions, chiefly those concerning property, industry and trade. For example, the real causes of the Civil War lay in the differences in climate, topography and soil, rather than in any essential difference in the character of the people of the two sections. Again, in speaking of the development of modern facilities for transportation, Channing says, "The development of these engines of civilization was destined to exercise an influence on the history of the United States far exceeding that of any political factor whatever." Such factors will be found to be ever at work, so that present day industrial, social and civic conditions will be found interesting and worthy of serious study in the light of historic knowledge.

Civics. Special attention should be given to the practical every-day workings of government as seen by the pupil in the city, state and nation. It is the aim to develop a sense of responsibility for good conduct in his own local and to some extent his state and national government. Very little time should be given to the study of the United States Constitution. This is considered work for more advanced students.

Business conditions and methods. Trade conditions; relations of employer and employed; division of labor; supply and demand; wages; healthy and unhealthy occupations; with a study of specific occupations as to qualifications demanded, opportunity for employment, for advancement, for personal development, wage, regularity of employment, dangers to health, pensions, etc.; companies, unions, etc.; laws affecting labor; simple accounts and office methods.

Hygiene. Light, heat, ventilation; drainage; bacteria and infectious diseases; food, clothing, exercise, rest, bathing; tobacco, alcohol, narcotics; accidents and first aid.

AIM SUMMARIZED.

Proper provision for vocational training for the trades would require at least one additional year of specialized trade-work. The pupil should not think, however, that this three-year course will make him a skilled mechanic, but should understand that it will give him a good start toward learning a trade, and that he can become an expert journeyman only after two or three years of practical experience. A school of this kind should be in close touch with the industries of the community, and probably in the last part of the course, and in the summer, it would be possible to arrange to have the pupils do some work in the outside shops.

It is believed that the course here outlined would be a satisfactory preparation for this advanced work, and that it would make an appeal to the boys and girls which would be sufficiently strong to hold in school many who would otherwise drop out soon after reaching the age of fourteen.

But the children who are most in need of the best we can give them are those who cannot have even the trade school before becoming wage earners. The course aims to teach these how to see facts and think straight; how to handle material and control themselves.

An attempt to provide vocational training for industry is being made in the elementary schools of Albany, Rochester, Columbus, Ga., Indianapolis, Leominster, Mass., Newton, Mass., and the Agassiz School and the North Bennett Street Industrial School in Boston. In every case the work is done in special classes.

CONCLUSIONS.

From observation of those classes nearest at hand, I may conclude that the members have:

a. On the industrial side, gained an insight into and a liking for real work, acquired some specific and useful knowledge of the subjects taught, and formed ambition for a higher grade of work and of living after leaving school.

b. On the academic side, attained as great, if not greater, proficiency in subjects required as would otherwise have been possible, and developed keener and more varied interest and better judgment.

c. In character, developed greater sense of obligation, of responsibility, of justice, and of honest work, together with habits of industry and thrift.

d. In personality, better poise, and more tidy habits.

Some members of the North Bennett Street Industrial School class for girls, who cannot continue through the eighth grade, have expressed their intention of entering the Boston Trade School for Girls, having received their incentive in the work of this year.

It is the writer's belief that where work of this character is being done, the boy or girl working daily in the school shop becomes more susceptible to the elevating and cultural influences of the school; more interested in the work which is purely academic; and developes more surely a strong character.

MADE BY PUPILS IN DECATUR (ILL.) HIGH SCHOOL.

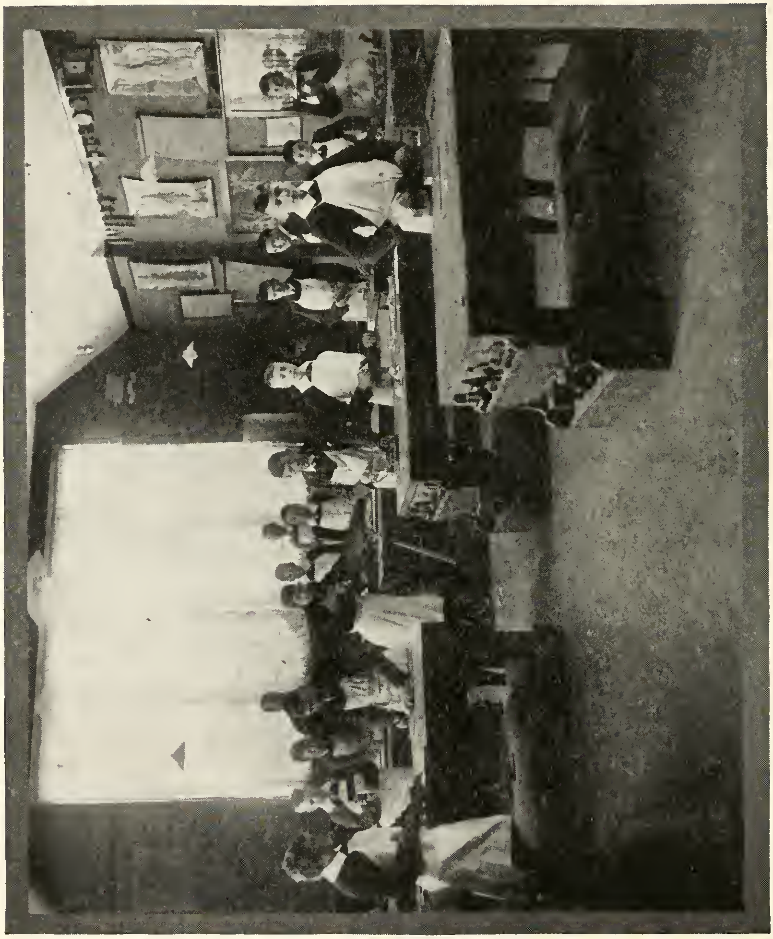

FIG. 14. CENTRAL HANDICRAFT CENTER, OXFORD.

VISITING MANUAL TRAINING SCHOOLS IN EUROPE.

II.—OXFORD AND BIRMINGHAM.

CHARLES A. BENNETT.

ON the ninth of February I left London for a tour thru the Midland district. I took an early morning train, and so reached Oxford, my first stopping place, in the forenoon. From the station I went at once to the Technical School, where I was cordially received by Mr. Allibone, a member of the National Association of Manual Training Teachers. The Technical School at Oxford is not a large institution, nor is it elaborately equipped. I found that Mr. Allibone was teaching a variety of technical subjects under conditions less favorable than I found in other cities. In the shadow of Oxford University does not seem to be a favorable spot to build up a strong technical school.

After showing me thru the shops, drawing room, and laboratories, Mr. Allibone took me to the Central Handicraft Center where I met Ernest F. Lay, head teacher of manual training in the elementary schools of Oxford. Fortunately a class was at work. After one has been visiting manual training shops for a few weeks he becomes very sensitive to the "atmosphere" of a school shop, and is sure to be impressed favorably or otherwise as soon as he enters. This was certainly my experience on entering Mr. Lay's class, and the impression was most favorable. The "atmosphere" was stimulating, the spirit fine. You could feel as well as see that the boys were putting forth their best efforts and that they were taking real pleasure in their work.

I took a photograph of the class but it was not as good as I wanted, and Mr. Lay has since sent me a better one, Fig. 14, taken with a wide-angle lens. This shows very clearly the type of bench used, the iron vise, and the position of the tool rack. The models of the course were hung in a row high up on the wall of the room. They included tool exercise pieces, joints, and a sprinkling of useful articles. The charts, drawings, models, and specimens of wood hung about the room gave proof that Mr. Lay believes in making his manual training lessons rich with information concerning the materials used in the work. In one corner of the room was partitioned off a storeroom which was literally covered—side and top—with a neatly kept lumber rack, Fig. 15. I thought of this as a good suggestion for some of our American teachers who work in very cramped quarters, without a storeroom and have no place for lumber, except a very untidy pile in the corner of the shop or in the hallway.

After leaving the Central School, Mr. Allibone took me thru many of the picturesque and historic parts of the town, and especially to several of the colleges—St. John's, Trinity, the far-famed Balliol with its beautiful chapel, and then to the Bodleian Library. By this time the rain, which had been increasing during the morning, had become severe, and I bade farewell to my gracious host and took a street car to the station, thinking to catch the mid-afternoon train. But just as I reached the station platform the clouds parted and the sunshine on the distant towers and spires became so alluring that I turned about and started for Christ Church College, the one spot in Oxford I wanted especially to see. I took great pleasure in finding my way by the map thru this ancient town. First I found a charming river view from the bridge, then the massive tower and walls of the old Castle standing out in bold relief against the partly clouded sky. Next I was lost in Paradise Square (according to Baedeker), and finally, after a half-hour or so, I was standing opposite the Tom Tower looking up at the statue of Cardinal Wolsey and studying the tracery of the older part of this ancient

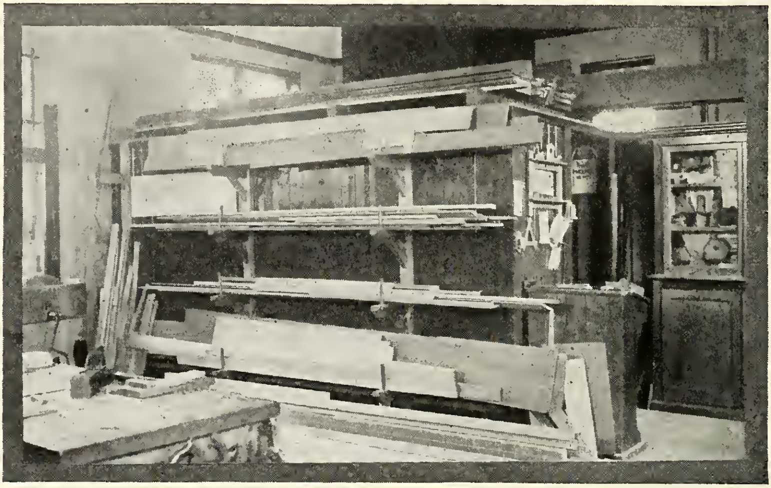

FIG. 15. LUMBER RACK AND STOREROOM, CENTRAL HANDICRAFT CENTER, OXFORD.

gateway. I passed thru into the quadrangle, across to the Hall, up the celebrated staircase with its ceiling of marvelous fan-tracery, and into the dining hall. The tables along both sides and across the platform at the end were spread with white linen and silver for the evening meal. Along the walls was a line of portraits of men who have made Christ Church College and England famous. However, I must confess to looking for painters rather than subjects. Holbein, Gainsborough, Millais, Reynolds, Herkomer, and many lesser artists were represented in this group. The room was finished in dark oak paneling with a richly carved ceiling. The windows were high up in the walls—high enough to be above the row of portraits. Altogether, the room was one of the most satisfying I ever entered.

From the Hall I went to the chapel, which is also the cathedral of the diocese of Oxford and originally the church of the priory of St. Frideswide, the Oxford saint, about whom Mr. Wells tells a charming story in his convenient little book, "Oxford and Its Colleges." I was especially fortunate at the cathedral because I had just time enough to view the interior, study the richness of the ceiling and the clearstory, and refresh myself with the beauty of the windows by William Morris and Sir Edward Burne-Jones, before the afternoon chapel service. I lingered in the Latin Chapel before the St. Frideswide window until most of the people had gathered for the service; then I took a seat nearer the entrance. The music of the organ, the chanting of the choir boys, the simple service, the attitude of the worshippers, gave to the glowing windows and the lofty nave their true, their spiritual significance. I felt my soul expand within me. It was a half-hour long to be remembered.

SCOPE OF THE WORK IN BIRMINGHAM.

That evening I reached Birmingham and the next morning at nine o'clock I was at the office of the Education Department where I met Charles Ayerton, the supervisor of manual training in the Council Schools. Before starting out to visit manual training centers we spent a half-hour or more in the office looking over an exhibit of courses and discussing the organization of the manual training work in the city. Birmingham has some kind of handwork provided for all the standards, and for both boys and girls, but the work for the Standards I to IV is not so fully developed and does not take so much time as that in the three higher standards. In the first four standards the time given to "hand an eye training" is one lesson of an hour's duration once a week. For classes of boys the work is as follows:

Standard I, paper folding.
Standard II, bricklaying and parcel tying.
Standard III, wirework.
Standard IV, cardboard modeling.

These courses are outlined in a series of books by A. W. Bevis entitled "A Course of Practical Lessons in Hand and Eye Training for Standards I-IV." There are four books in the series and they were published by O. Newmann & Co. of London about fifteen years ago. These courses are now undergoing modification, and are likely to be greatly changed in the near future. In Standard IV the cardboard modeling is being more closely related to the mathematics, and a new course in paper work for girls is being developed as the result of an analysis of the problems in cutting, folding, etc., connected with needlework. Figure 16 shows the first seven exercises of this course, which are based on the horizontal and diagonal folds. Head teachers in girls' and mixed schools are allowed choice between the scheme for boys' classes, another scheme involving paper work, clay modeling and brush drawing, and one of their own which may consist very largely of drawing.

For the boys of Standards V, VI, and VII shopwork is provided. In the city there are fourteen centers for woodwork and five for metalwork. There are about forty teachers in these centers and they give instruction to about 7,000 boys. Practically all of the boys of proper age and standing take this form of manual training. In fact, it is a required subject as much as any other in the curriculum.

The Government regulation states that a boy must be at least eleven years old at the beginning of the school year in which the shopwork is done, but Mr. Ayerton allows younger boys to enter his classes if their work in other subjects is satisfactory. He does not allow the regulations concerning the Government grant to interfere with what he thinks is the right age for admission to the shopwork. He ignores the grant in admitting pupils, and as a result, about two-fifths of his pupils are not counted in when the official statement is made to obtain the grant.

Mr. Ayerton does not take the backward boys over eleven years of age into his classes, as is done in London. In Birmingham such boys are provided for in a special school where half the time each week is given to manual training and drawing. Moreover, he fears that the London plan would meet serious objection from the class teachers in

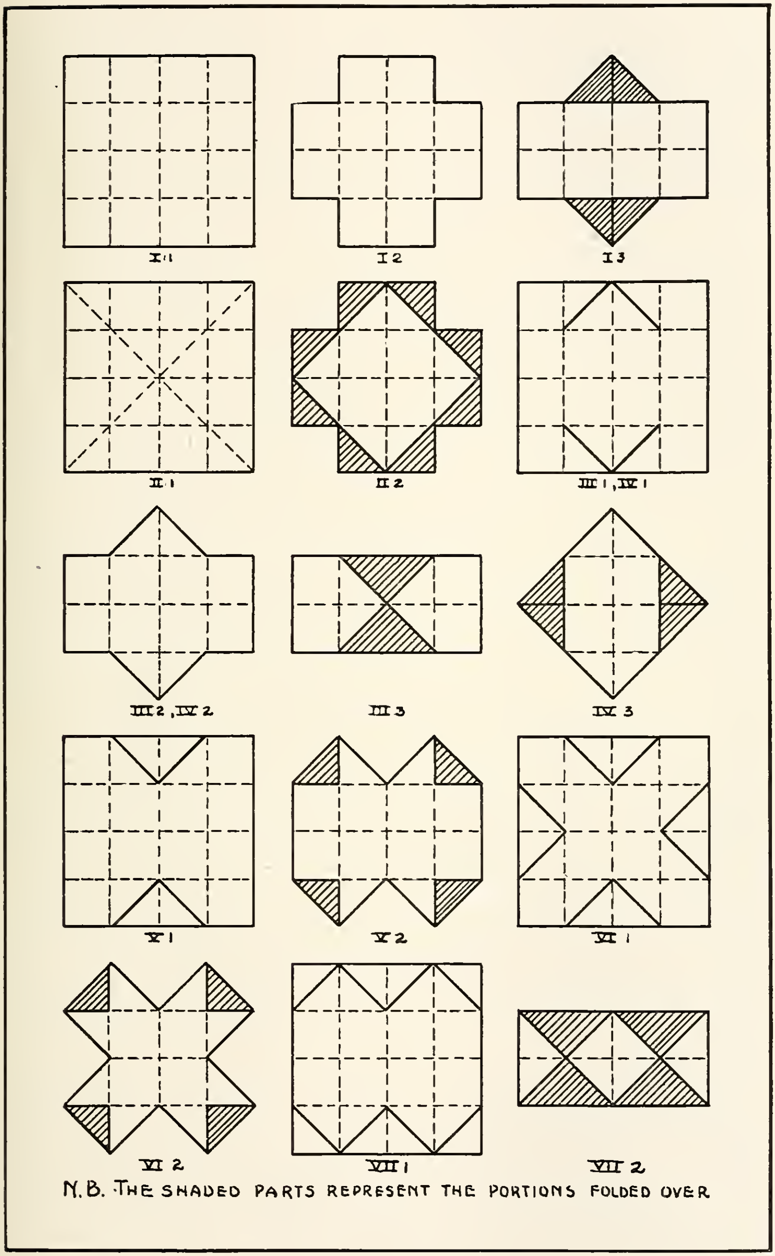
I 1
I 2
I 3
II 1
II 2
III 1, IV 1
III 2, IV 2
III 3
IV 3
V 1
V 2
VI 1
VI 2
VII 1
VII 2
N.B. THE SHADED PARTS REPRESENT THE PORTIONS FOLDED OVER

FIG. 16. PAPER WORK FOR GIRLS BASED ON AN ANALYSIS OF NEEDLEWORK.

Birmingham, because it would tend to break up the class work in other subjects. I was interested in the fact that some of the classes in the manual training centers came from the non-provided schools connected with religious bodies.

As in London each teacher has two calsses of not more than twenty pupils each per day—one from nine to twelve o'clock and the other from two to half-past four. In this time drawing, shopwork and note-book work are done. The drawing, except that in the pupils' notebooks, is mechanical, there being no vital connection between the shopwork and the freehand drawing department of the schools. In every case the pupil makes a drawing of the object he is to construct. Mr. Ayerton does not believe, as many of us Americans do, that pupils in the grammar grades are old enough to profit by work directly from drawings made by the teachers. He does, however, allow pupils to work out their own projects to some extent, but they must involve the exercises of the course, or their equivalent. The course may be changed by the teacher provided he has submitted to the supervisor a careful analysis of the proposed changes and can prove that his analysis is better than the supervisor's.

The note-books I saw were about 7½ by 10¾ inches in size and contained 120 pages. Four pages at the beginning and the same number at the end were given up to a "progress register." The headings in this were: date, drawings taken, models finished (number, commenced, finished), timber lessons, tool lessons, lessons on screws, nails, glue, etc., remarks. The right-hand pages were ruled with horizontal lines; the left were plain. The paper was of good quality for sketching with pencil. As I went about among the pupils at work, I saw notes and sketches that had been made in these books during the regular class period. I saw some good drawings from charts, from illustrative material, as ends of logs to show shrinkage, leaves of trees, and drawings of tools with each part named. This notebook work is looked upon as important. It is considered a preparation for keeping records in life after leaving school.

Pupils are encouraged to do home work. This may be drawing or making collections of illustrative material or work in wood or in other materials. The results of such home work are brought to the teacher for criticism. This voluntary work is readily connected with the teacher's talks on trees, timber, etc. In this connection I am reminded of a pragraph which I found in the manual training syllabus which was evidently intended as a warning to teachers who, in England as well as in

America, sometimes talk too much: "Not more than twenty minutes should be occupied out of each lesson on names, construction, and uses of the various tools, or the property and nature of different kinds of materials, how to distinguish them by sight, where they are grown, or how manufactured, and for what purposes they are chiefly used." The talks are illustrated by examples of timber, etc., and by charts made by the teacher.

The salary schedule for manual training teachers in Birmingham is, for assistants 80 to 110 pounds a year and for head teachers 85 to 140 pounds. This is being raised for teachers in charge of centers for sixty and eighty boys. The problem of securing and then keeping a sufficient number of teachers trained for the work is met (a) by a training course for teachers, and (b) by raising the salary schedule. There were about thirty young men in training, about half of whom were mechanics who wished to teach and the other half were teachers in the elementary schools who wished to become special teachers of manual training. The training course covers three years. In it three lessons are given each week—two in the evening and one on Saturday morning. The course covers both theoretical and practical work. Mr. Ayerton gives lectures on the theory and some of his assistants are selected to give the practical instruction.

SLOYD PRINCIPLES FOLLOWED IN BIRMINGHAM.

The course of instruction in woodworking, Fig. 17, is based on Swedish sloyd and therefore is in marked contrast with the London course. Every model in the course is a useful article. The first model requires the knife as the only cutting tool; the second involves the saw; the third brings in the plane and bit; chiseling is introduced in the fifth. Six or seven different kinds of wood are used in the course. The steps in the construction of the models are printed on cards for the use of the teachers and a tool analysis of the entire scheme is presented on mimeographed sheets. Similar sheets suggest lessons on trees, and other correlated work. For example, a sheet on the pen tray, suggests correlation with (a) mathematics—how to find point of tangency, definition of solid angle, projection of a point from view to view, squares and square roots, study of right-angled triangle (showing relation of hypothenuse to other sides), sum of angles in any triangle equal to two right angles; (b) freehand drawing—imitate the grain of a given piece of timber—show appearance of grain around a knot; (c) science—specific gravity (deter-

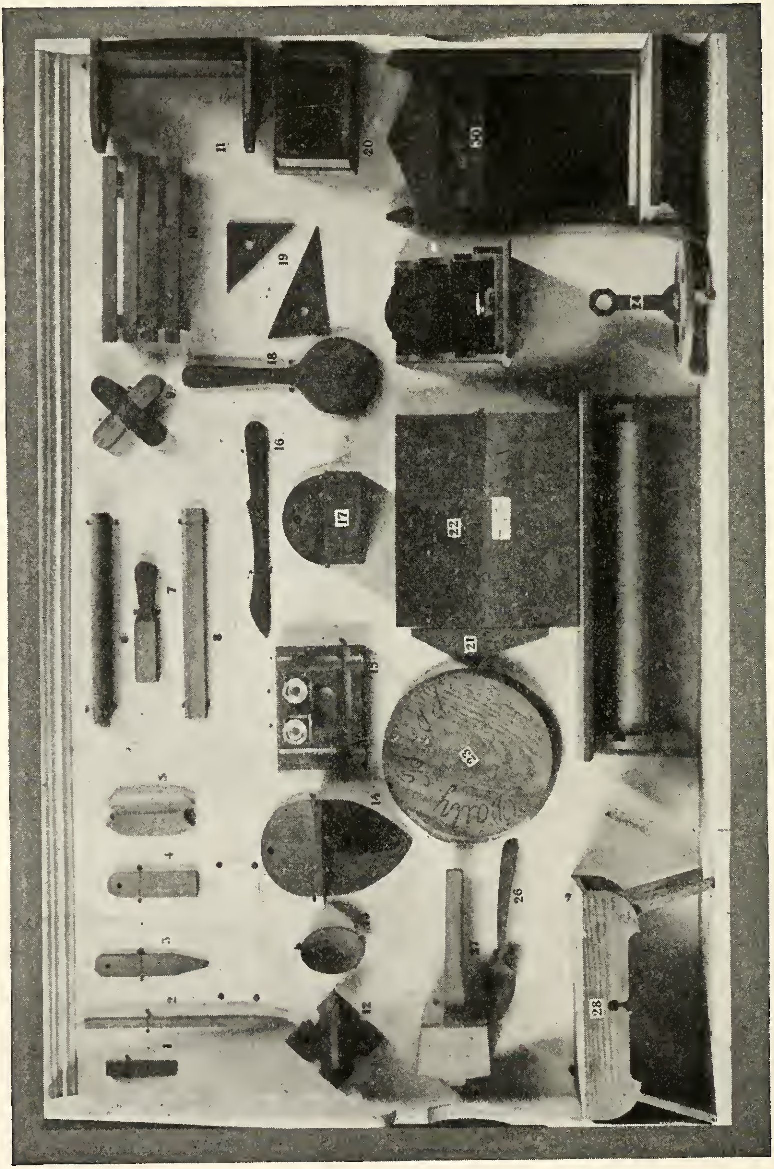
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FIG. 17. COURSE OF INSTRUCTION IN WOODWORK, BIRMINGHAM.

mined by experiment), density, mass and volume, laws of motion, inertia and momentum (illustrated by removal of plane-iron from its stock), sources and transportation of timber.

WOODWORKING CENTERS.

The first school visited was the Chequer's Walk Manual Training Center. This interested me at once because of the method employed in lighting the building. It is a one-story building with a saw-tooth roof, Fig. 18, and accommodates eighty pupils at one time. In this building four teachers are employed—one head teacher and three assistants. Here I had a good opportunity to study a typical equipment. Single benches are used in all the rooms. In the front of each are two swing doors behind which are ten pigeon holes. These are for the use of the boys—two each day—who work at the bench. Each boy has the exclusive use of one of the pigeon holes for unfinished work, etc. In an end cupboard in each bench are kept the tools belonging to the bench set. Each tool has a definite place either inside the cupboard or on the door. The tools of the set are as follows: Jack-plane, try-square, compass, tenon saw, three chisels, (¾ in., ½ in., ¼ in.), marking gage, marking knife, winding-sticks, bench-hook, mallet, hammer (without claw), metal rule, (English and metric), and a drawing outfit consisting of drawing board (9¾ in. by 12 in.), tee-square, triangles, scale (flat, graduated on both sides—English and metric), compass, pencil,

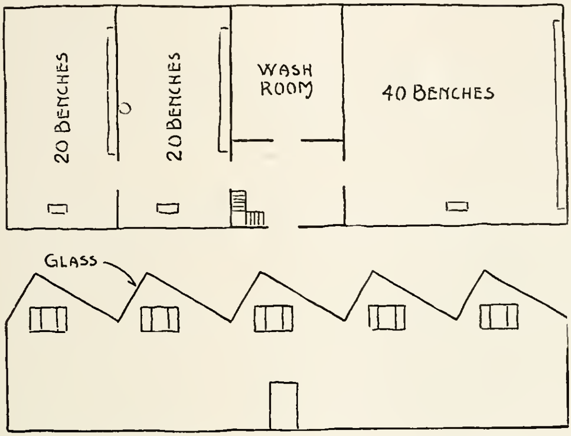

FIG. 18. CHEQUER'S WALK MANUAL TRAINING CENTER.

eraser. The metal rule was rounded at one end and had a hole in it to hang it up by. The tee-square blade was tapered in width from left to right to that the lower edge of the blade was neither parallel with the upper edge nor square with the head. The marking knife was merely a tapered piece of flat steel sharpened at the wide end like a skew carving chisel. When I asked why the metric scales were used, I was told that there is a growing tendency toward the metric system in the industries of Birmingham.

In this center I found that the teachers had a very convenient office and private work room over the hallway. Here they kept their books, drawing instruments, etc., and here on one of the walls was where the many charts were made that I found in the shops. About six feet above the floor a horizontal straightedge was fastened to the wall. Sliding on this with a blade downward was a large home-made T-square with one graduated edge. This device with appropriate triangles, black paper and white crayon, light paper and dark crayon, constituted the equipment of their productive chart factory. Fig. 19 shows one of the charts.

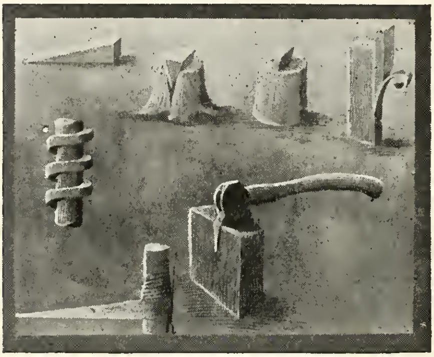

FIG. 19. CHART TO ILLUSTRATE THE WEDGE PRINCIPLE IN TOOL WORK.

In the afternoon Mr. Ayerton took me to the Oldknow Road Center where I met the head teacher, Harry Witt, who has devised a large number of excellent illustrative models, as well as charts. Fig. 20 shows the interior of his shop. Over the cabinet at the left of the door may be seen his models of rip and cross-cut saw teeth. Above these is a model illustrating the lever, and still higher one of the nail-puller, both of which are readily operated by cords at the right of the door. On the right of the clock is a model of a firmer chisel and on the left a plane-iron and plane-cap. Below these is a hinged blackboard to illustrate the relation of the projection planes in drawing. In the window at the right of the door can be seen branches of leaves from timber trees. These the held in place by an extra light of glass fastened against the leaves. In front of the lower row of panes in a window on the opposite side of

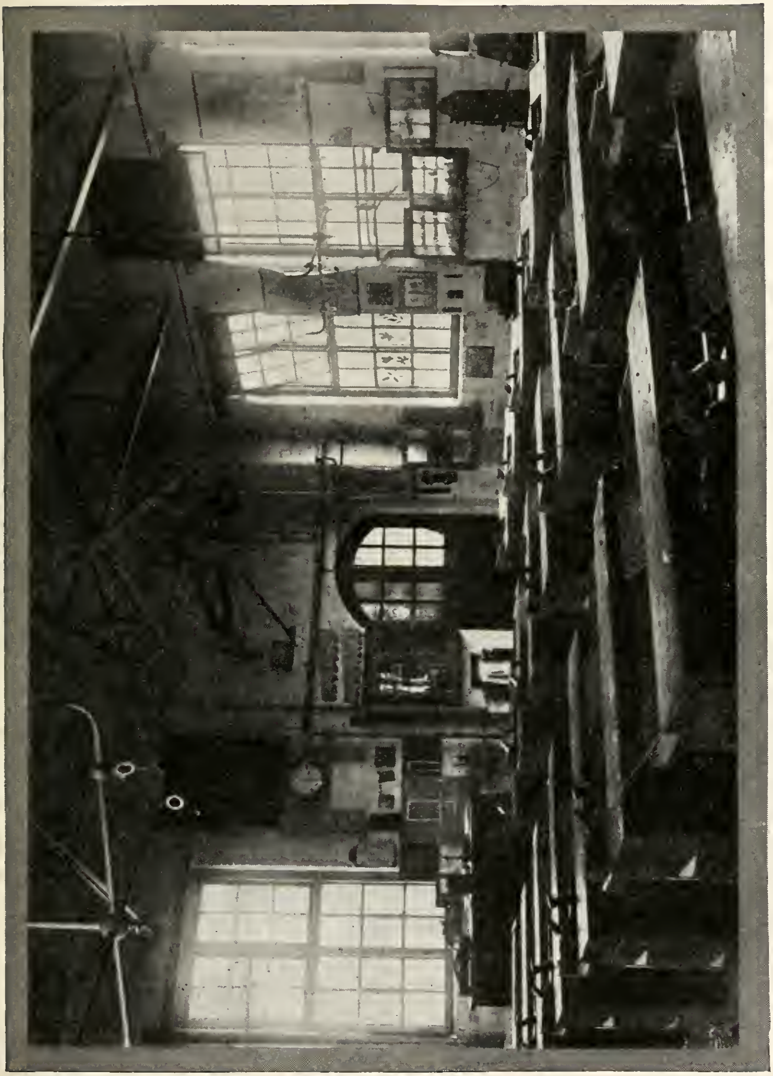

FIG. 20. OLDKNOW ROAD WOODWORKING CENTER.

the room is a glass tank filled with water in which experiments in specific gravity are performed. Figs. 21 and 22 show two excellent models. Fig. 21 shows the wrong and the right ways to fasten two boards together with screws. Fig. 22 illustrates a winding surface. The winding effect is produced on the thin top board by turning the posts which are really nuts and contain wooden screws fastened to the cleats above. I found that Mr. Witt is using a compound microscope in demonstrating that a chisel or knife edge is serrated and therefore must be moved like a saw to get the best results. A good friend of mine here in America would question the value of Mr. Witt's theory and point out that the knife works easier on a diagonal cut because the actual cutting wedge is thinner than when cutting directly against the edge of the blade. However, I have always liked to think that the serrations also help to make the edge cut easier, and so was interested in Mr. Witt's experiments. Mr. Witt is also using the microscope to show the structure of wood. Several manual training centers, tho not all, are provided with such microscopes. They are considered very desirable, but are very expensive.

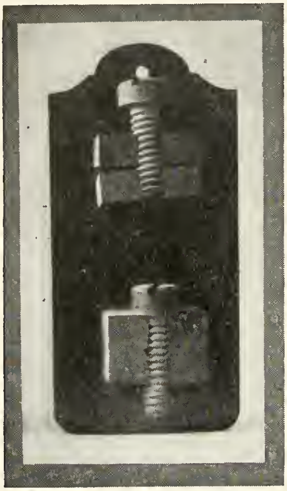

FIG. 21. RIGHT AND WRONG USE OF SCREWS.

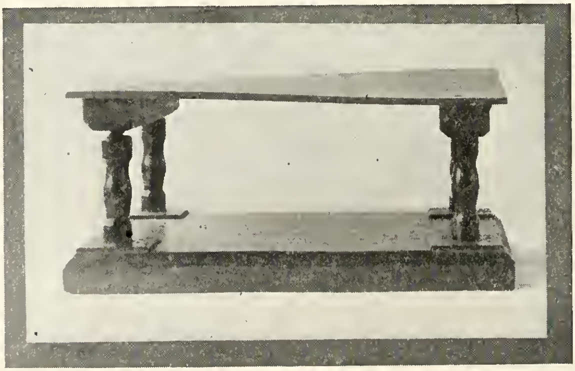

FIG. 22. MODEL TO ILLUSTRATE A WINDING SURFACE.

Mr. Ayerton told me that seventeen of the nineteen manual training centers in Birmingham are open in the evening. The students in the evening classes are such as have finished the elementary schools. They range in age all the way from fifteen to fifty years. During the past eight years this evening work has grown to be an important part of the work of the department. I was much surprised at the extent of this evening work, but later found similar classes in other cities.

METALWORKING CENTER.

At the Rea Street Metalworking Center we found thirty-two boys under a head teacher and an assistant. Boys in this particular district have no opportunity to take woodworking, metalworking being given them instead. The reason for this is that in this section of the city there are many shops for the metal trades.

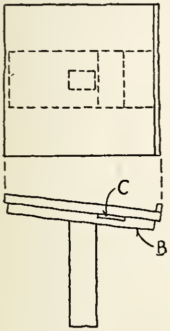

FIG. 23.

When we entered the room the pupils were at work in drawing. This was being done on a board fastened to a standard, Fig. 23, and held in the vise. A slit in the cleat B allows the tee-square to be held underneath when not needed in drawing. For use in teaching the drawing and for purposes of demonstration, the models of the metalworking course, Fig. 24, are made large size in wood. There are also in the room other wooden models for demonstration purposes; for example, a trip hammer, section of a blast furnace, and a puddling furnace. There are also many diagrams drawn in chalk illustrative of some tool or process.

The equipment of the room, Fig. 25, especially interested me since I am such a firm believer in the value of metalworking as a manual training subject. At each working place on the long benches is a vise and a drawer containing the following tools: inside calipers, outside calipers, try-square (with solid head), spring dividers, cold chisels (one of them a cape chisel), scriber, straight-edge, 30° set square (triangle of steel), 45° set square, 10 in. flat file, hammer. There was also a drawing outfit similar to the one used in the woodworking centers.

In addition to these tools there were others for general use in a case. There were also in the room three saw gummers worked by hand, one of which may be seen in front of the windows, Fig. 25. Each of these was fitted up with a ¼ in. or ⅜ in. punch, with which a small boy could easily bite off pieces from a sheet of soft steel about 1-16 in. in thickness. Besides these gummers there were shears for cutting out pieces from the

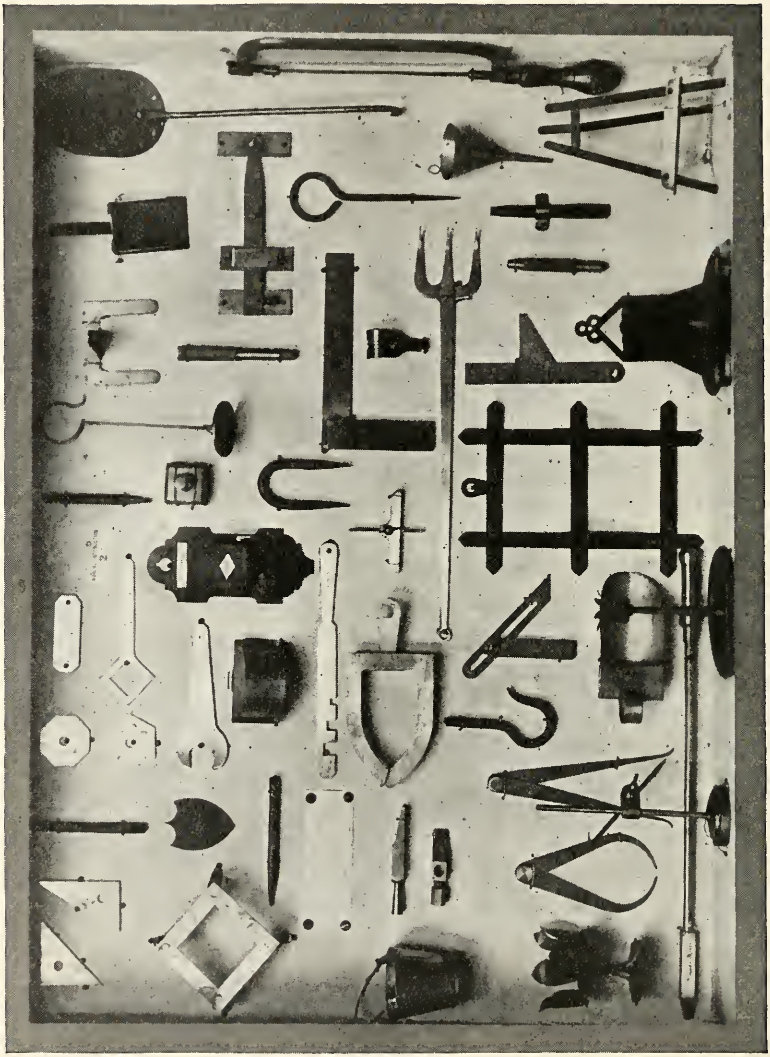

FIG. 24. METALWORKING COURSE AT BIRMINGHAM.

sheet, three small upright drills worked by hand power, four foot-power lathes of about 10 in. swing and 2½ or 3 ft. bed, two forges with hand bellows under the forge, two anvils, a grindstone and three surface plates for every ten boys—three on each long bench.

About two-fifths of the models shown in Fig. 24 involve either forging or turning or both, tho the processes in each are quite elementary. In forging the processes of drawing out and bending are the most common. I knew that in the jewelry section of the city art metalwork was being taught instead of this course, so I asked how it would do to substitute art metalwork for the forging and turning in this course, thus making it possible to largely reduce the cost of equipment. Both the head teacher and his assistant would much prefer the present scheme of their own school, but Mr. Ayerton pointed out that their statements might be influenced somewhat by the fact that the organization of the work at present is such that there is no opportunity for correlation between the art drawing and the shopwork. However, I could see that the vocational aim of this work would not be met so fully for this section of the city if my suggestion were to be carried out.

NEEDLEWORK AND COOKERY IN BIRMINGHAM.

The next morning I met Miss Smith, the supervisor of needlework in all the grades above the infant school. The girls begin needlework at seven or eight years of age and continue it thru the seven standards. In the first three the girls learn the fundamental technical processes of needlework—both sewing and knitting. The problems given are not mere exercise pieces or samplers, but include useful articles. In the four upper standards the children cut out and make difficult parts or garments. A special feature is made of the mending. In the fifth standard they mend stockings and in the sixth and seventh both outer and inner garments. A sewing machine is used more or less in the sixth and seventh standards. There is one in each school and in some schools there are two. Miss Smith prefers to omit all pattern cutting because she considers it wasteful of time and material. It is better, she believes, to give patterns already cut, and then teach the economical and proper use of these patterns. There is none too much time in which to teach this in the elementary school and this is what the children most need when they get out of school in these days of good cheap patterns.

I was fortunate in finding Miss Thorne, supervisor of cookery and laundry instruction just as she was leaving her office to visit schools.

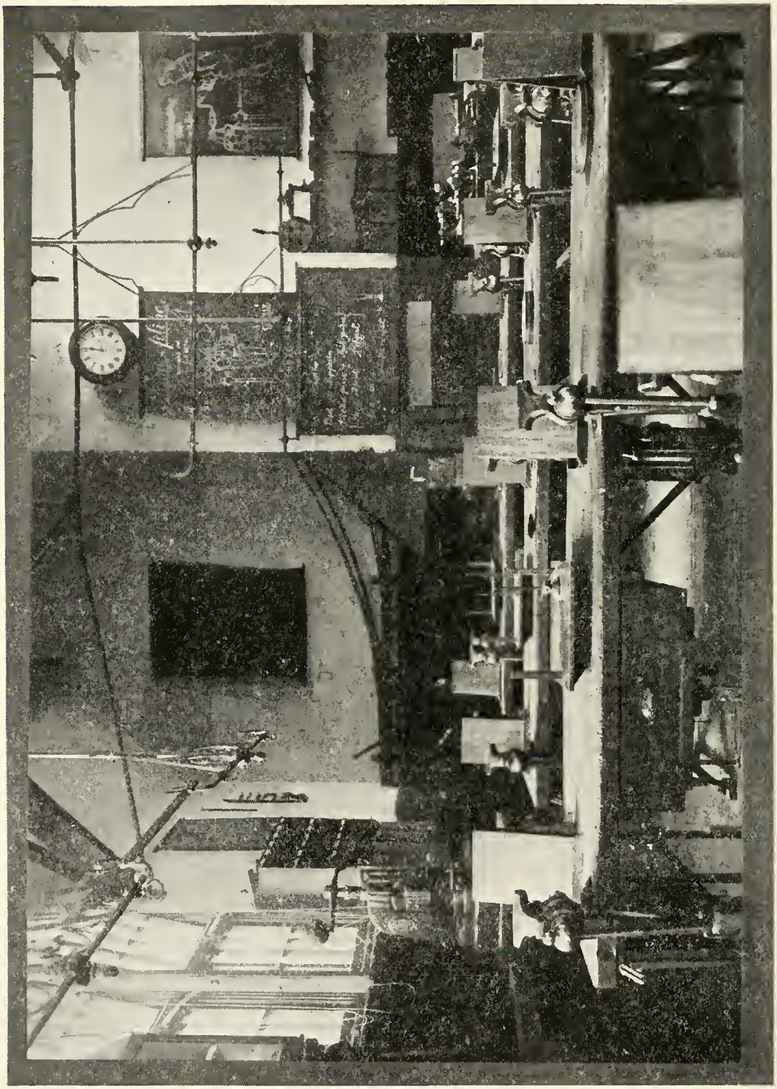

FIG. 25. REA STREET METALWORKING CENTER, BIRMINGHAM.

She allowed me to accompany her to one of the cooking centers in a very poor section of the city. The room was not planned especially for the purpose and was, perhaps rather small, yet I understood from what Miss Thorne said that the equipment was fairly typical of that found in all the centers. In the middle of one of the long sides of the room, and built into the wall, was a cook stove with two ovens, one on each side of the fire box. This stove was quite different from our American stoves in that the front of the fire box was open like a grate. In fact by sliding back the cover and opening a part of the smoke flue just above this fire box it was possible to have a tiny open grate fire. Projecting from the front of the wall over the stove was a crane from which joints of meat were suspended while roasting in front of the open grate. Below on the floor or hearth was a space for the pan used to catch the drippings. For the first time I appreciated the full meaning of the term dripping pan. The joint was suspended by cords made of many strands of worsted. These, if properly made, would keep the joint turning slowly, and they are used in preference to the more expensive devices for the purpose, because the children can have them in their own homes. This idea of keeping the equipment simple, inexpensive, and in harmony with the home conditions of the community was noticeable thruout the room. Miss Thorne said that gas stoves had been provided in some of the cooking centers, but not in this section of the city. To the right of the stove on the same side of the room was a cupboard where crockery and supplies were kept in orderly arrangement as they should be kept at home. To the left of the stove was a case of shelves upon which were kept the sauce pans and other dishes used in the cooking. In front of the stove was a long deal table of the simplest possible design, without drawers or bins or closets underneath. Around this table the entire class of eighteen girls were able to work at one time, tho very close together. At one end of the room was a small table with a rack over it for keeping rolling pins, etc., and at the other end was a sink. On the long side of the room opposite the stove were two or three rows of simple school desks on theatre-like platforms. Here the puipls sat during the demonstration lesson and to write their notes. The desks were provided with ink bottles, and pens were distributed and collected by a member of the class.

In regard to methods, I learned from Miss Thorne that the pupils work individually or by twos, never in larger groups. The time given to a lesson is from two and a quarter to two and a half hours. Miss

Thorne considered this essential, as it is impossible to hurry the process of baking. She deprecates rush in teaching cooking. The pupils are given a demonstration lesson, the teacher doing the work in front of the class, discussing and illustrating the scientific principles involved, and emphasizing the value of the food in nourishing the body. Then the pupils do the work themselves. After this has been completed, while the pupils are washing their dishes and the table, the teacher writes on the blackboard three or four sentences summarizing the main points of the lesson. The children then take their seats at the desks, read these sentences in concert from the blackboard, and then copy them in the notebooks provided for this purpose. In the two and a half hours there is time enough for all these things to be well done without hurrying, provided, of course, that the teacher has planned well. The lesson I saw was very skillfully given.

The purchasing for the class is done each day by two girls appointed by the teacher. These are called monitors, and I understand they change with each lesson, or very often. The monitors come to the school early, receive cash from the teacher, go to the stores, make their purchases and bring with them the change to the teacher. The girls like this responsibility, and it is made much of by the teacher in giving practical lessons is economical buying. The food that is cooked may be, and usually is, purchased by the girl who cooks it, she paying enough to cover the cost of materials used. I saw several girls taking home the dumplings they had made.

Home cooking is encouraged. The girls bring notes from their mothers stating what they have cooked, and the teacher posts a list of the things reported where it may be seen by the classes coming into the room.

Cookery is taught to the girls of the fifth, sixth and seventh standards —fifty hours in each. Laundry work also is taught in the sixth and seventh standards where equipment for such work has been provided. Pupils are taken into classes with reference to age rather than with reference to their attainments in other school subjects, so that it often happens that a class coming from a given school has pupils from three or four different standards. The teacher may have one-third of her class between the ages of ten and eleven. The Government, however, in its grant of funds, recognizes only pupils of eleven years or older as suitable to receive instruction in cookery.

THE MUNICIPAL SCHOOL OF ART.

In the afternoon I went at once to the Municipal School of Art and was shown thru the building by a young man who explained the plan of instruction. The building contains twenty-one classrooms besides a museum, library, offices, coat rooms, etc. These include rooms for wood-carving, bookbinding, modeling, casting, metalwork, architecture and building construction, printing, writing, and illuminating, stained glass and interior decoration, design, painting and drawing from animals and from life. The striking feature of the work in the school is the memory drawing. This is looked upon as essential to any successful work in design. In teaching this, animals in motion are employed as models. So I found one of the drawing rooms equipped in a unique way. Instead of casts of Greek statuary, the room was provided with a large number of live birds and animals. There were owls and guinea pigs, a brilliant rooster, a rabbit, a squirrel, a pet cat, the school dog, and many others. These were in cages or tied where they could be easily observed by the pupils seated at drawing desks or easels scattered conveniently about the room.

I was fortunate in being at the school at the time of the annual exhibition of students' work and in being taken thru the exhibition, which was in another building, by the head master, R. Catterson-Smith. He explained the work in detail, beginning by showing me the work of the class entering from the elementary schools. These pupils are selected with reference to talent shown in the drawing work of the schools and their desire to specialize in art work. This selection is made easy owing to the fact that the entire drawing and art instruction in the city schools is centered in the Municipal School of Art. The head master of this school is the director of the drawing work of the elementary schools of the city and has a staff of assistants for supervisory and instruction work in these schools. Whenever one of these assistants finds a child who ought to specialize in art work, he encourages him to enter the Art School. There is no examination for admission and no tuition, the only condition being that the pupil must have passed the seventh standard or reached the age of fourteen years. When such children have been admitted to the Art School they spend all their time in art work. At the end of the first year these "free admissioners", as they are called, may compete for ten monetary scholarships of five shillings a week; at the end of the second year the ten winners may compete for six scholarships of six shillings a week; at the end of the third year these six scholarships may be renewed for a further year at seven shillings a week if the students still progress satisfactorily. These students study five and a half hours daily for forty-six weeks in a year. After the completion of this course the students may compete for scholarships of from ten to thirty pounds a year. In this way the process of selection and development of talented pupils is constantly going on.

I was much interested in the course of instruction as outlined to me by the head master. The following is his statement of it as published in the handbook of the exhibition at the time of the International Drawing Congress in London:

> First year.—Plant form from memory; common objects from memory; memory drawing of objects in the city museum; drawing from live animals; painting from historic ornament; lettering; modeling plant forms in clay; metalwork (raising, repoussé, and jewelry), and practical geometry, which includes making measured drawings from objects. Weekly lectures are given upon the materials and tools used by jewelers and silversmiths. It will be noticed that most of the drawing is from memory.
>
> Second year.—Those who do not succeed in obtaining a monetary scholarship at the end of their first year, and still desire to remain in the school, repeat the first year's course. The successful students take the same course during the second year; but they are placed under different teachers; they draw from the antique—mainly from memory—and they do more advanced metalwork, with, perhaps, a little enameling. If the head master considers it desirable, some students substitute for metalwork another craft, such as stained-glass work, wood-carving, and book illustration, or they commence to work for the art teacher's certificate, according to the requirements of the Board of Education.
>
> Third year.—The students now begin to confine their studies to the craft they have decided to follow.
>
> Fourth year.—Similar to third year. Some of these free students enter for the Government examinations in freehand, model, and geometrical drawing, and memory drawing of plant forms.

INTERESTING WORK IN THIN BRASS.

I was especially interested in the metalwork required in the above course. The metal used is at first very thin brass—as thin as paper. This of course takes the impression of the tool very easily. One reason for teaching metalwork in this course is that the manufacture of jewelry is one of the leading industries of Birmingham, but the principal reason for giving metalwork the prominent place it occupies in the early part of the course is that this material serves the head master especially well in working out his theory of instruction in design. He considers it of great importance that design begin with the tool and the tool process rather than with a highly finished drawing such as has often been required in government examinations in England. In the metalwork his theory is literally reduced to practice. The pupil begins to design with a piece of thin brass, a repoussé tool, and a hammer. He makes a dent in the brass and repeats this to produce a border, and another, and another. Then he uses two tools and makes more borders. He increases the number of tools and makes more borders and some surface patterns, all the time studying spacing, proportion, and pleasing combinations. This is done first on an experimental piece of metal, then perhaps on a napkin ring or button or clasp, the favorite form being circular, Fig. 26. As the work goes on the pupil makes tools to produce any new or modified spot he wishes to use. By this method designs are produced which are sure to be suited to the material, and one feels satisfied on looking at them because of this perfect adaptation and the directness of the process. Pau-

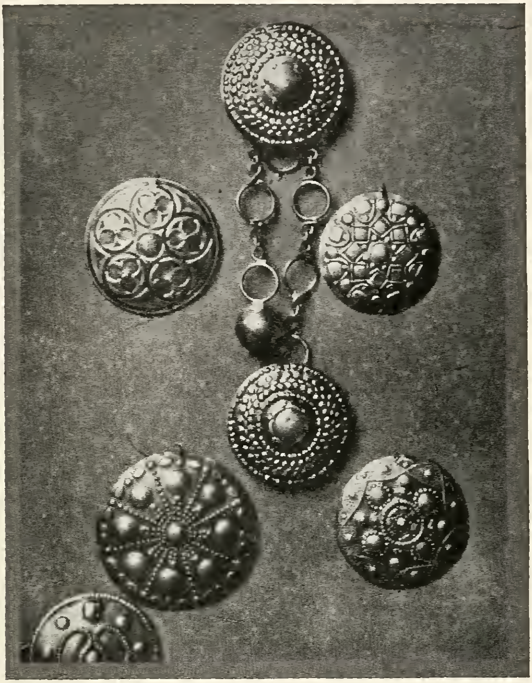

FIG. 26. WORK IN THIN BRASS, MUNICIPAL SCHOOL OF ART, BIRMINGHAM.

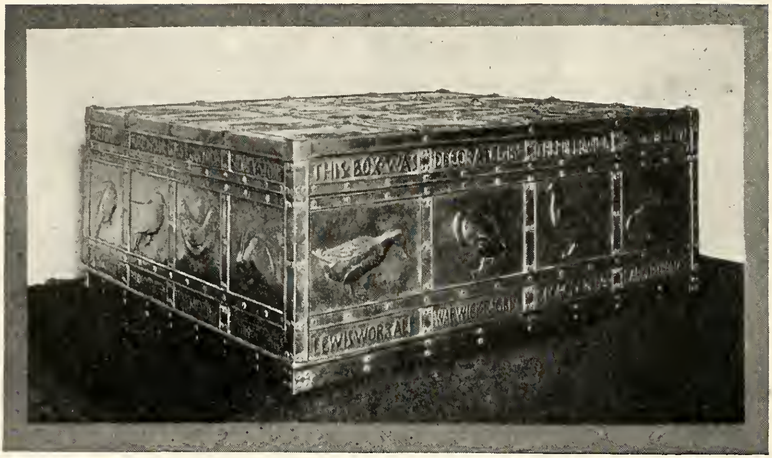
THIS BOX WAS DECORATED BY

FIG. 27. A CLASS BOX MADE OF WOOD AND COVERED WITH THIN BRASS, MUNICIPAL SCHOOL OF ART, BIRMINGHAM.

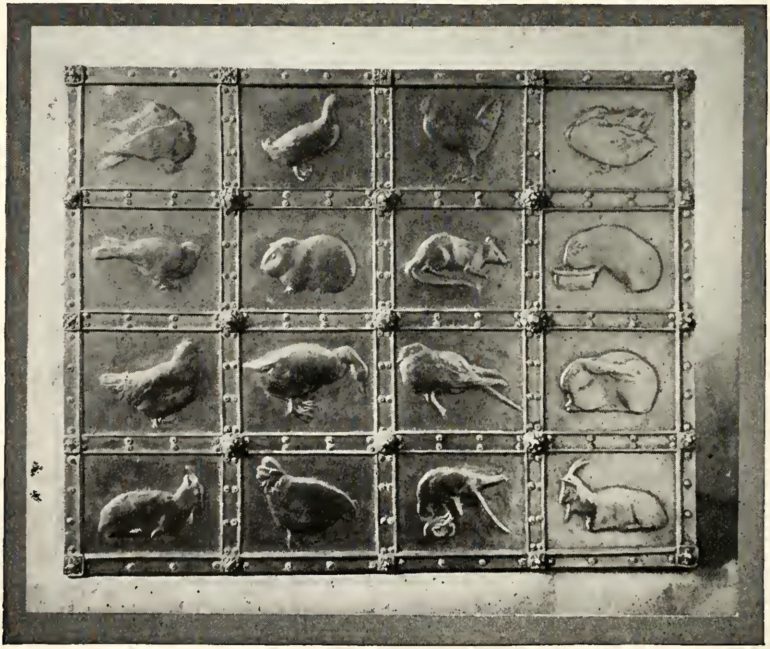

FIG. 28. TOP OF CLASS BOX SHOWN IN FIG. 27.

city of ideas is avoided by having the pupils study fine examples of metalwork. Appreciation of beauty of form is gained thru drawing and modeling.

Among the things made by this process I noticed the following:

(a) Practice piece—design developed from tool—borders and surface patterns—stamped from underside, producing softened effect—design not drawn on metal before stamping, but made direct on metal with tool.

(b) Domical fur hooks or clasps in great variety, Fig. 26—backed with heavier metal—chains connecting.

(c) Lettering worked from back—some Renaissance letters very effective.

(d) Finger plates—spot designs arranged in borders around the plates.

(e) Napkin rings—round, hexagonal, elliptical—made of heavier metal.

(f) Square fur hooks similar to (b).

(g) Plates and trays with borders of spot designs.

(h) Round box with domical cover—heavier metal—cover design in "strap work" pattern.

(i) Diamond-shaped drawer pull—all-over spot pattern made with diamond-shaped tool.

(j) Hat pins—domical heads backed with heavier metal—spot designs.

(k) Boxes of wood covered with thin brass—line and spot designs—special tools made to produce spots which can be arranged in conventional leaf patterns, acorns, etc.

(l) Escutcheon—line and spot design.

(m) Elliptical picture frame.

A more advanced type of brass work which interested me is represented by the brass covered box, Figs. 27[1] and 28, made by an entire class. Each student contributed one or more of the panels. Notice that the names of the members of the class are around the bottom of the sides of the box.

MEMORY DRAWING.

After Mr. Smith had shown me thru the entire exhibit, which was a large one and covered a wide range of work, I was allowed to remain and make a more careful study of the work in memory drawing. I have already alluded to the fact that he regards memory drawing as essential in the training of a really successful designer. The mind, he says, must be well stored with clear and definite images which the trained hand can reproduce at the designer's will. On looking over the drawings more carefully I found it was possible to classify the work in memory drawing under four heads, thus:

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[1] The photograph for this illustration, also those for Figs. 28, 29, 30 and 31 were presented to me by the head master of the school.

I. Drawing common objects after the models had been removed—books, lantern, pick-ax, stuffed bird, flower.

II. Drawing objects which are constantly moving in front of the student, especially live birds and animals—dog, rabbit, (Fig. 31), duck, goose, hen, squirrel, etc.

III. The student goes to the museum and makes a simple outline pattern sketch of an art object. The teacher takes the sketch on the pupil's return to the studio, and then the student makes a finished drawing of the object from memory—vase with all-over pattern of engraving, jewelry of intricate pattern.

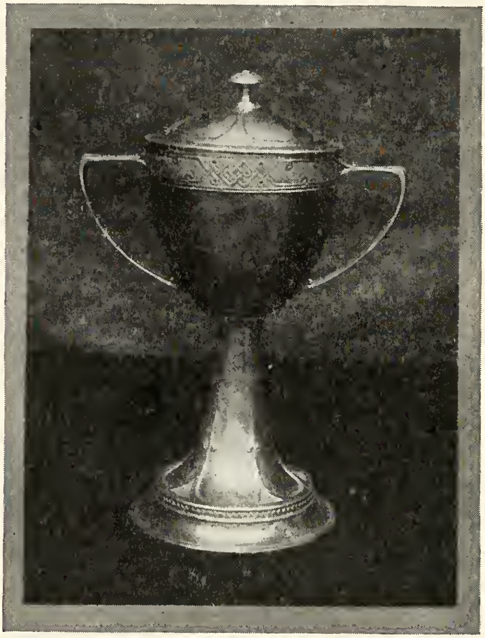

FIG. 29. MADE BY STUDENT IN MUNICIPAL SCHOOL OF ART, BIRMINGHAM.

IV. Drawing the human figure from life. After preliminary life drawing of the usual sort (a) the student would make a drawing, taking only five glances at the model, or (b) he would make the drawing while the model was in motion, as at work with shovel or pick-ax, or (c) he would make the drawing after only one look at the model.

The same general method used in the drawing is also used in the modeling.

Some excellent craft work was shown in the exhibition. Fig. 29 shows a piece of metalwork that won the third prize in a national competition; the andiron, Fig. 30, also won a third prize. The reproduction does not do justice to the andiron because it is richly decorated with Damascene work.

SCHOOL FOR JEWELERS AND SILVERSMITHS.

One of the branches of the Municipal School of Art is the Vittoria Street School for Jewelers and Silversmiths. This is a trade school situated in the jewelers' quarter of the city. Most of the six hundred pupils in this school are in the evening classes. They are from the jewelry factories, and come for instruction in drawing, designing, enameling, engraving, etc., to supplement their mechanical skill gained during the day. The methods of teaching in this school are the same as those used in the art schools.

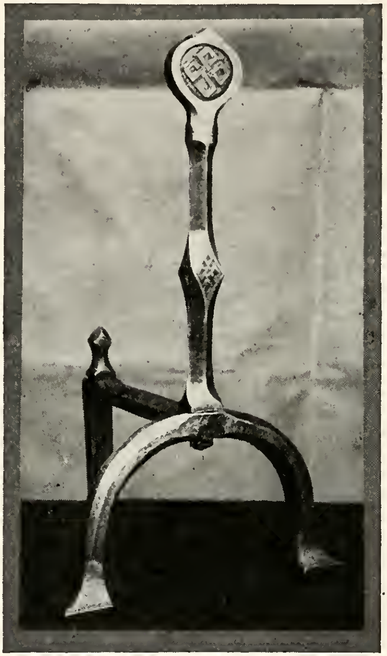

FIG. 30. MADE BY STUDENT IN MUNICIPAL SCHOOL OF ART, BIRMINGHAM.

In this school I saw a class of boys from eleven to fourteen years of age receiving instruction in thin brass work, such as I mentioned in connection with the exhibit of the Art School. This class had been in attendance since August, coming one-half day each week. The boys were from the elementary schools and were taking this work as a substitution for the manual training work of their course. This class was an experiment.

In speaking of the demand for the art side of jewelry work the director of the school stated that many of the manufacturers looked upon the school work as unpractical and of no use to them because it aimed to train the art sense especially instead of giving the students the mechanical processes used in the factories. On the other hand there were a few manufacturers who were friends of the school, believed in its work and saw the larger aspects of the problem. These men were leaders in the industries and so secured to the school the needed support of the factories of the city. The director frankly admitted that he was doing work not so much for this generation as for those to come. He is making an effort to elevate taste and the industries. He considers it essential for the future of the jewelry industry in Birmingham that her workmen should be able to compete with those of France and Germany in design as well as in workmanship. Now Birmingham is furnishing the world with cheap jewelry; she ought to produce jewelry that is good in design as well as cheap.

This kind of doctrine is fully as much needed in some of our American manufacturing cities as it is in Birmingham.

(*To be continued.*)

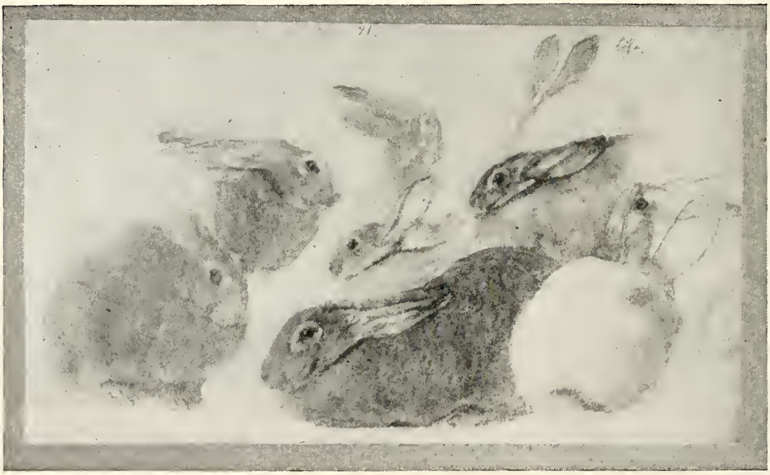

FIG. 31. ANIMAL DRAWING. MUNICIPAL SCHOOL OF ART, BIRMINGHAM.

INDUSTRIAL EDUCATION A PHASE OF THE PROBLEM OF UNIVERSAL EDUCATION.[1]

EUGENE DAVENPORT.

RIGHTLY or wrongly, for good or for ill, we are committed to a policy of universal education, a policy whose wisdom, I believe, has passed the stage of discussion among thinking people.

Now, no system of education, however good in itself, can claim to be or hope to become universal if it does not touch and benefit all classes of men and all legitimate branches of their activity, both industrial and non-industrial; vocational and non-vocational. Indeed universal education means exactly what it says—the education of all sorts of men for all sorts of purposes and in all sorts of subjects that can contribute to the efficiency of the individual in a professional way or awaken and develop the best that was born into him as a man and as a human being.

Looked at in this broad way, industrial education does not differ logically from any other form of professional training that requires a large body of highly specialized knowledge. Nor do industrial people as such necessarily constitute a class by themselves but are men like other men who love and hate, who earn and spend, who read and think, and act and vote, and do any and all other acts which may be performed by any other citizen. Now all of this leads me to maintain the thesis that industrial education is not a thing apart but is only a phase, albeit an important phase, of our general system of universal education, a thesis that is more plausible when we remember that every man needs two educations, one that is vocational and one that is not—one that will fit him to work and one that will fit him to live. When we remember that there is less difference between industry and occupation than we once assumed; when we remember that ninety percent of the people follow industrial pursuits and will continue to do so; when we remember that all major industries like other essential activities must go on in the future as in the past, even though every man in the community were a college graduate, and when we remember that it is for the public good that these major industries be developed and occupied by educated men, surely this position is not unreasonable.

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[1] A paper read before the Department of Superintendence, N.E.A., Chicago, February, 1909.

All parties are agreed these days that in order to secure a fair degree of efficiency in some way some sort of specialized instruction should be given in industrial pursuits. The old apprentice system has passed away and the work of instruction for industrial efficiency seems to be thrown upon the schools. It is a new problem and they appear not to know quite what to do with it. It is perfectly clear that industrial education calls for new and different courses of instruction for those designed to fit for non-industrial pursuits. Upon this question there is no doubt. The only question is whether these specialized courses of instruction constitute a part of our public school duty or whether the peculiar educational needs of industry and of industrial people may be left to take care of themselves. In discussing industrial education, as with all other forms of education, it must always be remembered that we are dealing with the man as well as with the craftsman, and I use the term craftsman in its broadest sense to cover the work of the lawyer as well as that of the farmer.

And this man; what of him? Surely he is a factor in the case. He is something more than a farmer or a doctor or a lawyer, or else he is something less than a man. His education is not to be limited by the demands of his vocation. We have too many of that kind already in all professions—constituting a kind of museum of educational parrots that go through their daily stunts, each considering himself highly educated and all other men at best merely trained.

Yes, the man himself, the human element in the case—he must be educated. And if he be truly educated he will first of all be trained in some profession—no matter what—and he will, second of all, be trained outside of his profession so that he will be bigger than the means whereby he earns his bread and butter: and this applies to all men of all vocations, for there is no such thing as a learned profession except in the sense that all the major activities are learned.

And so I lay down the proposition that whether the education be industrial or otherwise vocational, it is but a part, though an essential part, of the education of a man and that all these specialized forms of vocational instruction are but different phases of our great problem of universal education, to which we as a people are committed.

Like all great purposes actuating the masses of men the development of this idea of universal education has been a growth. It began with the conviction that in justice to the individual and in safety to the state, all men of all classes should possess at least the rudiments of learning, and the first step toward a complete system of universal education was the free public school wherein the child of the rich and of the poor alike, whether genius or dullard, may learn to read and to write and to reason, which after all are fundamental to all education. And so it is that our elementary education is universal in the sense that it applies to all the children of all classes of people and without discrimination.

This marked a new epoch in the life of industrial people, because hitherto the policy of the world had been to keep working folk ignorant apparently in order that they might remain contented with the hard lot to which Providence had presumably assigned them; because, forsooth, must there not be hewers of wood and drawers of water? So were laid the foundations for a system of universal education—universal in the sense that it applied to all men—affording not only the rudiments of learning but opening a highway even to the college and the learned professions, and many escaped thereby from a hard life of toil.

But no scheme of education is truly universal or can hope to become so until it not only touches and uplifts all classes of men but also touches and uplifts their industries as well; for it is not expedient that men should desert industry as soon as they are educated, but rather that they should remain and apply their education to the development of the industries that the people may be better served and the economic balance of things be not disturbed by the evolution of an educational system aiming to become universal.

The need of attention at this point became evident especially to industrial people and on July 2, 1862, Abraham Lincoln affixed his signature to the most far-reaching bit of federal legislation ever enacted. I refer to the land grant act whereby there was provided for each state of the union, "at least one college whose leading object shall be, without excluding other scientific and classical studies . . . to teach such branches of learning as are related to agriculture and the mechanic arts . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." Here we have the whole scheme not only of industrial but of universal education in a nutshell—a liberal and practical education without excluding scientific and classical studies: what a text for an educational discourse!

Building on this broadest of educational foundations most of the states have established industrial education on a new basis and some of them have so combined and interwoven it with other forms of education that none can tell where the one leaves off and the other begins. These are the great state universities whose lead in this respect is being rapidly followed by institutions not on the land grant foundation, until now we can truly say that on college levels to-day industrial education is not a thing apart, but is an integral portion of the great educational effort by which the people of a commonwealth seek both to educate all classes of men and at the same time develop their resources, their industries, their occupations, their literature, their art and their activities generally. This is universal education in its fullest sense.

Our elementary education, therefore, is universal in a sufficient sense, and our university education is rapidly becoming universal in its broadest sense, because here all subjects are studied and taught and all occupations and industries are represented and made to flourish in a common atmosphere of higher education.

But as yet we have no system of *secondary* education that can be called universal and until the matter is settled and settled right at this point our system is weak at its most important level, because it is our secondary education that touches our people during their formative period, and that really reaches the masses in such a way as to be truly universal in extent.

I say that our secondary education is not yet universal. True, the high schools are open to all who have finished the grades, but they do not offer to most classes of people that instruction which is a preparation for life and which the needs of the times and the impulse of the people demand.

The high schools took their cue originally from the old-time academies which were training schools for classical colleges. Since then primary education has become universal because it involved nothing but opening the schools to all the people free of tuition. The education of the colleges has become or is rapidly becoming universal because the people demand that the benefits of higher education shall not be limited to a few favored occupations and those who follow them—all upon the ground that such a course would be pernicious, because against the public welfare.

The same influences are beginning to work in our high schools, which are moving in the wake of the colleges, it seems to me, in a way that is wholly commendable and that needs only to be accelerated and not retarded.

The high schools are schools of the people and in response to their demand they have added to the old-time classical courses those in modern science, in manual training, in household science and, indeed, many are now adding agriculture, stenography, telegraphy, bookkeeping, type setting and a list of vocational courses almost too long to be mentioned, all without prejudice but vastly to the enrichment of the old-time courses of study.

So the high schools are rapidly following in the lead of the colleges and if matters go on as they are now drifting in some of our best schools, it will not be long until, in response to public demand and common sense, we shall have a complete system of universal education in the largest sense of the term and of all grades from the elementary schools upward, in which men and women of all kinds and preferences will be able to get that education which will not only fit them for life but fit them to live. In the name of progress let this good work go on.

There are but three influences, it seems to me, that can interfere with the proper evolution of the high school. They may be outlined as follows:

1. The movement in certain quarters for separate industrial schools—agricultural schools in the country and trade schools in the city—quite independent from the high school system which is assumed to be indifferent if not antagonistic to industrial life.

2. The attitude of a few remaining exponents of the old idea that schools should teach nothing that by any possibility could be put to any manner of use.

3. The difficulty involved on the part of the high schools in adding not only to their educational purpose but to their courses of study, their equipment and their teaching force, with sufficient rapidity to meet the new demands and mold the whole into an educational unity without such delay as shall make the claim seem true that after all the high schools have no real desire to serve the people in their industrial activities, but will do no more than is necessary to half satisfy what they regard as an irrational public demand. Thus the high schools are put at a disadvantage at this most difficult period in their evolution particularly as teachers are yet to be made even while these new ideals are to be fitted into and made a part of our permanent educational policies.

Now these considerations are worth reviewing at the present juncture, because what the high schools need is time, and this is the element in the case least likely to be afforded. The activities of certain educators in favor of separate agricultural schools of one kind or another, and what I am bound to call the selfish influence of certain commercial interests demanding city trade schools to teach the sort of handicraft which will produce skilled workmen in the shortest possible space of time and best enable us to meet foreign or other competition in manufactured articles—this activity and this influence seem ready to sacrifice almost anything for immediate results. This American edition of the German peasant school idea is a most dangerous because a most insidious and powerful menace to the right development of the American high school, which is or may be the most unique educational institution on earth, and which will constitute, if it can rightly develop, the key to the advantageous position which America ought to occupy both socially, politically and economically, and which she can occupy if she is far-sighted enough at this point and at this time.

If present tendencies can go on unhampered, it will not be long until every community can have its high school which will reflect with a fair degree of accuracy its major industries and do it too in the light of the world's knowledge and of the world's ideals. Such schools will turn out men and women ready to do the world's work and to think the world's thoughts as well as to dream the world's dreams and share in its ambitions. If we combine our energies we can have such schools in America wherein every young man and every young woman can secure an education that is at once both useful and cultural, and that too within driving distance of the father's door. If we unite our educational energies we can do this but we cannot do it in separate schools.

We can combine the vocational and the non-vocational in our high schools if we will and each be the better for the other. On the contrary if the arts and crafts and industries are taught in separate schools the following results are inevitable:

1. There will be as many different schools and as many different forms of education as there are different forms of industry, with little of mutual sympathy and nothing of community of purpose.

2. The vocational future of the individual will be decided not by intelligent choice but by the accident of proximity to one of these schools or the exigency of earning power.

3. If industrial education is given only in industrial schools then the high schools will lose forever their hold upon the masses, for ninety percent of the people are industrial and always will be, for boys will follow occupational instruction. This will reduce the high schools to

the teaching of girls and the work of preparing for college and they will lose forever the influence upon American life which they might exert by molding the ideals of the masses as they instruct them in their industries.

4. The separate industrial schools will always be inferior to what the high school might be, for, being established to serve special ends, they will naturally attain those ends by the most direct means possible: indeed they must be almost exclusively technical or else resort to an amount of duplication and expense that would hardly be tolerated by their patrons.

5. The products of these schools would be successful from the narrowest business standpoint; but unsuccessful from the larger point of view: they would be trained rather than educated.

6. Such schools would force boys to choose their calling or indeed have it chosen for them at a very early age, and without much opportunity for intelligent choice. Once chosen, however, the decision would be final. The results, however, would highly satisfy business demands which are ever ready to sacrifice the man to his efficiency.

7. If members of the several vocations are to be educated separately the education will not only be hopelessly narrow and needlessly expensive, but what is even worse our people will be educated in groups separately, without knowledge of or sympathy with each other, producing a stratification of our people that is not only detrimental to society but dangerous if not fatal to democratic institutions. Such schools however, will draw the masses and have all the surface indications of success.

So, all things considered, I most earnestly advocate the taking over of our industrial education in all its forms into the existing system of secondary schools, seeing to it that one-fourth the time of every pupil is devoted to something vocational, something industrial, if you please, and no industry is too common to use for this purpose. It is the common things of life that are fundamental and it is through them that we teach life itself.

It is not necessary to bring all occupations and industries into our schools: some are not well adapted to our academic conditions, but it is necessary that we bring in a goodly variety of what may be called the major activities, industrial and non-industrial, in order that life shall be taught in a variety of its forms and that the boy shall have a reasonable chance for choice.

Trade schools, would you have them? By all means, but I would have them as a part of the secondary school system. Agricultural schools? Yes, but as departments of the high school. Cooking schools? Yes, and more; I would have schools of household affairs, but I would have them as integral parts of the high school. Schools of stenography and typewriting? Yes, but I would not disconnect them from the high school any more than I would cut off from womankind the girl who needs perhaps for a time, perhaps always, to earn her own money.

In brief, there is no class of occupation that is followed by large masses of people that I would not bring into the high school and teach as fully as circumstances would permit, and I would compel every student to devote not less than one-fourth and not more than one-half his time to these occupational lines.

I have said that a second influence operating to restrain the high schools from moving in this matter as fast as conditions require is the remnant of an old academic belief that the purpose of schools is to "make men," whatever that may be, as distinct from making men ready for life. These are they who should teach nothing that could by any means be put to any sort of use. With them education is a luxury, not a necessity; a kind of holy thing that evaporates or in some way loses its essence when put to common uses or into the hands of the masses of men.

These be they who are always careful to speak of industrial education as "training," using a term whose meaning is understood from its frequent application to horses and dogs.

Now to such let me say that the thing which all men everywhere now demand, whatever their vocation or means of livelihood, is not training merely but *education,* and they mean by that such contact and intimacy with the world's stock of knowledge as shall first of all develop the industry, and second but not secondarily, develop also the man.

Thinking men now know that, education or no education, culture or no culture, whatever the grade of civilization we may evolve, certain fundamental industries must still go on. Moreover, they know that if these fundamental industries are to be well conducted and our natural resources developed, then these activities must be in the hands of capable men; yes, of educated men, for industry, like every other activity of man, is capable of development by means of orderly knowledge and trained minds.

They know, too, these thinking people, that men of capacity cannot be found to develop these fundamentals except they may also themselves partake of the blessings of life and the full fruits of our civilization. They know that the days of hewers of wood and drawers of water, as such—condemned to a life of drudgery—are over on this earth wherever civilization exists, and that education like religion must somewhat rapidly readjust itself to new conditions and prepare to help the common average man to lead a life that is both useful to the community and a satisfaction to himself.

The aristocracy of education like the aristocracy of religion, whereby a few were saved at the expense of the many, is over, and education, like religion, must help the common man to meet and solve the common issues of life better than they have ever been met and solved before—hence industrial education; hence vocational education; hence universal education.

These good people who shy at the term, industrial education, are remnants of a past condition when educators and others entertained that old-time and curious conception of industry, whereby industrial people were assumed to be uneducated and were by common consent assigned a social position of natural inferiority as if a farmer or mechanic, for example, acquired by his daily life a kind of toxic poison that not only destroyed his better faculties but was likely to exude and soil or injure others.

Let me call the attention of these good people to the fact that whatever their social status the industrial people hold the balance of power politically and socially, for they constitute ninety percent of the population, and that for all practical purposes, and in the last analysis, they are the people, and their education whatever it is to be will really constitute our system.

The colleges learned long ago that to meet modern needs they must afford every man two educations: one intensely technical to meet his business needs and make him an efficient member of society, but which would tend to narrow him as a man; the other non-vocational, which has no money-making power but whose effect is to liberalize and broaden the man by attracting his interests and widening his knowledge outside the field wherein he gains his livelihood.

Now the high schools must learn the same lesson and the sooner they do so the better for all interests. Therefore these high schools that are introducing the industrial are developing in the right lines. The high schools are not preparatory schools for college. They are preeminently the schools wherein the people are fitted for life. Where one man is educated in college, twenty will get all their preparation in high schools. The high school, therefore, is the place wherein the boy shall find himself to the end that if he goes to college he will have upon matriculation exceedingly clear ideas about what he intends to do, and if he does not he can go out from the high school at once and take some useful part in the world's work. The large number of high school men, even graduates, who have no plans and more than all no fitness, preparation or inclination, for any sort of useful activity is a pathetic and dangerous fact—pathetic because so much good material has been wasted; dangerous because the high schools must either change their ideals and introduce the industrial freely, or the industrial masses will find other schools of their own that will meet their needs as they have been met on college levels, but as they have not yet been met in secondary grades where the masses go.

Now the colleges have learned that it is not necessary to absorb all the time of a student in order to turn out an efficient man vocationally. Much less is it necessary in secondary schools. On college levels from one-half to two-thirds of the student's time suffices for the vocational, and when we learn better how to teach, results can doubtless be attained with still less, leaving a generous amount of time for the pursuit of non-vocational and therefore of liberalizing courses, for the effect of a course of study, whether narrowing or broadening, depends less upon the subject matter than upon the attitude of the student and the purpose for which he takes the course. Chemistry to the farmer is a professional subject; to the journalist or lawyer it is non-professional and liberalizing.

If we will honestly take into our high schools as we have taken into our universities all the major activities, splitting no hairs as between the industrial and the professional, for no man can define the difference so imperceptibly do they shade from one into the other—if we will take them all into the high school as we have already taken them into the universities, and carry them along together, the vocational and the non-vocational, side by side, day after day, from first to last so the boy is never free from either, then will all our educational necessities be met and we shall have gained a goodly number of substantial achievements, prominent among which I would mention the following:

1. One-fourth of the time of the boy or girl could be devoted to vocational work in class-room or laboratory throughout the course.

2. This would turn out every boy with some skill in some branch of the world's work, and do away with that large and growing number of young high school graduates who are fitted for nothing and are good for nothing in particular.

3. It would attract the attention of the boy to self-supporting activity before he loses his natural ambition by too much schooling with no initiative.

4. It would turn out girls with some training in household affairs and those who desired it in such occupations as women follow for self-support.

5. It would vastly uplift most occupations and all of the more ordinary industries by bringing into their practice the benefit of trained minds and methods.

6. It can do all this and still leave three-fourths of the time for the acquisition of those non-vocational lines of knowledge which all men and women need, because they are human beings getting ready to live in a most interesting world.

7. In this way, we should have a single system of education under a single management but giving to all young men and women really two educations; one that is vocational, fitting them to be self-supporting and useful, the other non-vocational and looking to their own development.

Expensive? No more so than to have it done in separate schools surely. It will be done somehow, and the only question now is, will the high schools really rise to their opportunity and secure through themselves a real system of universal education, or are they to lose their chance and we have in the end not a real but only a patchwork imitation of a system of universal education?

I am perfectly well aware that all this will be held by some as a lowering of standards and a degrading of education by commercializing it. Against this conclusion, I protest most emphatically. Does it degrade a thing to use it? Does it degrade religion to uplift the fallen or to sustain the masses of men from falling? Is education a luxury to be restricted to a few favored fortunates or is it a power to uplift and sustain and develop all men?

Are you afraid to educate the ditch digger? Is the education of the gentleman too good for him? Are the facts of history too profound or the satisfaction of knowledge too precious to be the common property of man? Does it make my satisfaction less when it makes his more, or are you afraid that he will climb out of the ditch if he is enlightened?

There is no danger of that. I have dug ditch and laid tile every month of the year and that since I was a college graduate, and I am ready to do it again. I am ready to do my share of the world's work; yes, of the world's dirty work. It was Colonel Waring that cleaned up New York City. It was the educated engineer that made a sanitary Cuba. The educated man does anything that needs to be done to get results. It is the uneducated or badly educated that fails to comprehend the eternal balance of things.

I desire to call attention to one more phase of our problem; to what may be called our leisure asset. There are two leisure classes, one few and unimportant, the other large and important. The first consists of the idle rich who by accident were born after their fathers, and who intend to live a parasitic exsitence, paying for their needs with other people's money. They are altogether useless. It matters little how they are educated and the sooner they die off the better for the world. They do not think; they do not act; they only vegetate and glitter. The wealthy who do not belong to this class are too busy for leisure.

The other leisure class is the great industrial mass, who, after all, own and control about all the useful leisure in the world. The minister has no leisure. The teacher has no leisure. The lawyer, the leader everywhere, has no leisure. What he does he does under pressure and because he must.

But the farmer, the craftsman, the industrialist generally, labors only in the daylight hours and for a portion of his time. What he does with the balance of his waking energies is of the utmost concern. Here is the great racial asset, both social and psychical; both economic and political.

If this great mass of men, constituting all but the degenerates, can be properly educated, the racial asset of their leisure moments will in the end be tremendous. It is this mass and what it thinks and does in its leisure hours either blindly or intelligently that will ultimately fix the trend of our development and the limits of our achievements. It is better that they be educated and educated broadly.

Moreover, it is out of this mass that leaders arise and if their education be sound, then will our leaders be wise and safe. You cannot maintain any more an educated aristocracy. There will be but one aristocracy and that will be the aristocracy of personal achievement and if we do not want the world entirely commercialized we must so merge our industrial education in our general system as to have in the end not a mass of separate schools with distracting aims and purposes, but a single system of education catering to all classes and all interests. It is the only influence that will preserve a homogeneous people.

In thus amalgamating the vocational and the non-vocational, I would like to say a word for what might be called the parallel system as distinct from the stratified. That is, I would have a boy from his first day in the high school to his last have to do with both the vocational and the non-vocational. I would have him every day take stock of things vocational in the terms of world values. I would have him devote a full fourth of his time to what will bring him earning power, to be used for that purpose if he needs it and to give him an independent spirit if he does not need it. Every man is a better man if he feels the power to earn his way, whether he needs it or not.

Do you say that this will so cut into his time as to prevent his getting an all-round education? Then I will say that he will never get an all-round education anyway; that the most he knows at forty will be learned out of school and that the business of the school is to give him a good start.

I beg, too, for a reform in the idea that a course is framed mainly for the one who graduates. If the vocational and the non-vocational are properly paralleled the course is good from whatever point it is left and whenever abandoned it has taught the student the proper balance between industry and life; between the means and the ends of life.

All this will take time because it means to some extent the readjustment of ideals, the addition of new courses of study and of new materials and methods of instruction. It means the making of a new class of teachers who must largely train themselves by a generation of experience. It means the making of a more complicated system of instruction than has ever been undertaken—a system as complicated as American democratic life.

But it is worth the while for nothing better is possible. It is easier, of course, to short-circuit the matter by assenting to the separation of industry and education, but no race need hope for supremacy nor for the evolution of its best till it combines industry and education, which belong together in the schools as they do now and always must in life.

So I say to the high school,—Do not wait for approved courses of study, nor for the production of skilled teachers. Go ahead and do the best you can. An honest effort is half the battle, and it is worth more now than it will ever be again. Do not hesitate till methods are marked out. If you do that, you and the cause are lost, for the separate industrial school will surely come. We know the ideal—An educated American in all the activities of life. Let us go ahead and produce him and mend our methods later on.

Education is no longer a luxury. It has become a necessity for the doing of the world's work. It is no longer for the edification of the few; it is for the satisfaction of the many; and whether we regard it as industrial or non-industrial; as contributing to the efficiency of men or to their elevation in civilized society; however this or any other educational problem is regarded, they are all but phases of our general and stupendous problem of universal education, the best guide to whose solution is to teach in a unified system of schools all the things that the community needs to know and let the individual take his choice concerning the vocational subjects.

ART CRAFTS, COLUMBUS, OHIO.

THE ADAPTABILITY OF WORK IN COLD METAL TO EDUCATIONAL NEEDS.

RAY L. SOUTHWORTH.

THE aim in developing work in cold metal is to give an interesting practical variety in general industrial cold sheet-metal operations with an educational end. We have, in some of our schools, courses that involve work in copper, thin metal fitting, soldering, filing, chipping, and more advanced courses in forging, foundry and machine metal work. The three latter together are probably the most common. Their advantages are open to a few who remain in the high school until the last years, but the equipment is expensive and thus impossible for many communities. The cold sheet-metal work submitted herewith seems to be rich in educational value, interest and use, yet is far more economical in first cost and maintenance and is even a competitor with the average wood-working equipment.

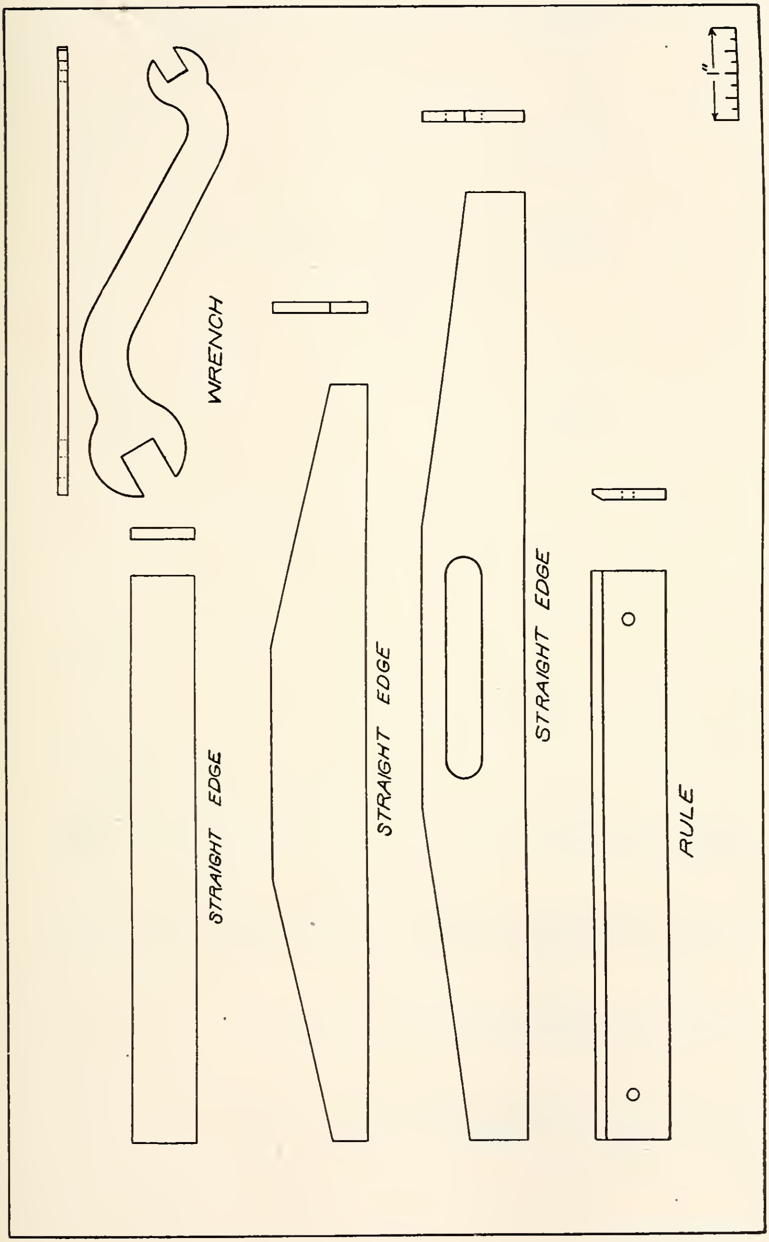
There are several reasons why cold metal possibilities have not been developed more, altho in some foreign countries schools have developed courses apparently suitable for their own needs. In the first place, there have been great changes in the commercial and industrial world during the last generation, especially in methods of construction wherein wood has been greatly superceded by metal and the use of metal has been greatly increased. Few attempts have been made to develop metal work for educational ends and some of these efforts have done more harm than good because of the lack of excellence in design and proportion. Furthermore, experience with the old methods of chipping and filing has caused some to feel that the work in cold metal cannot be made interesting. Our training schools lay stress upon work in wood and have not developed courses in metal work that are interesting and practical. Chipping and filing was once a universal shop process, but now improved foundry processes and modern methods and machines have displaced much of this work. Besides, its value in the school may be acquired in some more interesting and congenial form. It may be that we exhaust, almost to a fault, the possibilities of wood and overlook certain reasonable and great possibilities of metal. When we began to develop subject matter for manual training, wood was much more in evidence in the constructive world, while now, metal is being put to an increasing number of uses, in many instances superceding wood. With all this, there is now an awakening to the necessity of organizing the materials and processes of the school shop so as to afford a real stepping-stone to the actual industrial constructive operations of the manufacturer. So with this recognition of metal, even the sheet-metal, there is a place and a demand for a certain metal work that shall be representative of American conditions and meet American needs.

The subject matter shown herewith was employed with a third year high school class in forty minute periods daily for five months. Many of us would like to see one term of this work more elementary in form given in the seventh or eighth grade, especially when manual training is given in the seventh and eighth grades already. This should be of particular value to those pupils who leave school at the end of the grade school. In such work the basis of the course should be instruction in the properties and possibilities of metal, with the fundamental processes as cutting, shaping, fitting, methods of fastening and finishing. As with all educational work, the needs of local conditions should be considered, together with the cost, interest of work to the pupil, result of such work and the local industries.

Perhaps the most desirable place for this work in the high school is in the last half of the second year. It should precede and form a foundation for machine metal work. This work allows of a middle course between the "art metal" and a course whose projects are fixed designs. Where conditions allow and it is desired some or all of the projects may be designed by the pupils thereby bringing in original or individual work.

There is a special demand for this kind of metal work in certain communities where the pupil goes directly into metal working industries from the school. Where the "art metal" work is given it seems best, when possible, to follow it by this cold metal, or of the time allowed to sheet metals divide the time evenly between these two. This work frequently appeals to pupils and parents who find neither interest nor value in the so-called "art metal" work, and when properly presented and conducted it promotes a closer connection between home and school, for at a comparatively small cost for materials and equipment the individual pupil may carry on this work at home.

The drawings show the content of this work, which consists of projects that are useful tools. The course is divided into six groups, with a seventh group for the especially apt pupil. The first three groups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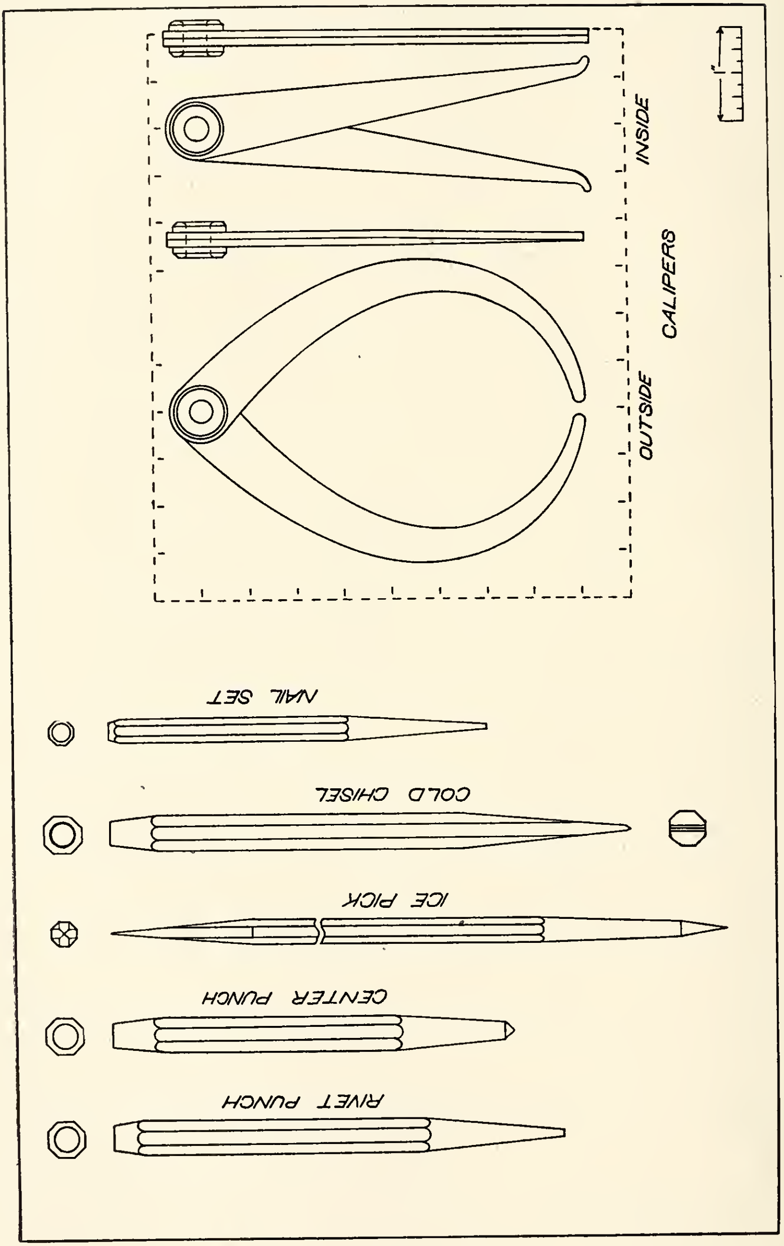
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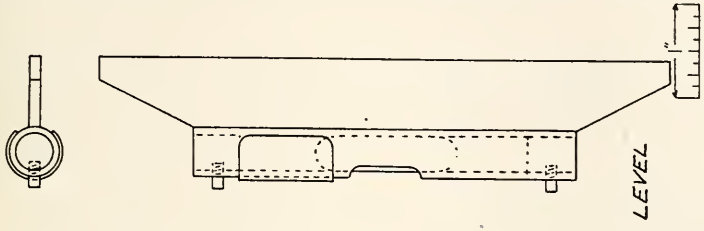
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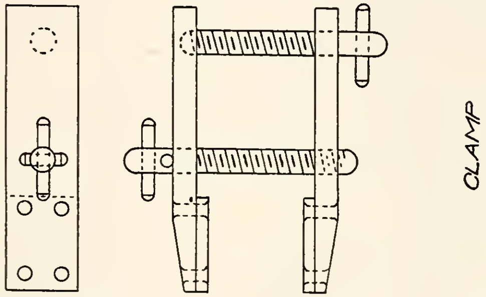
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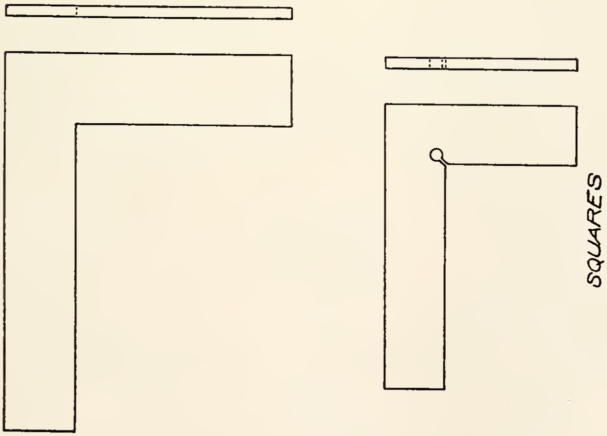
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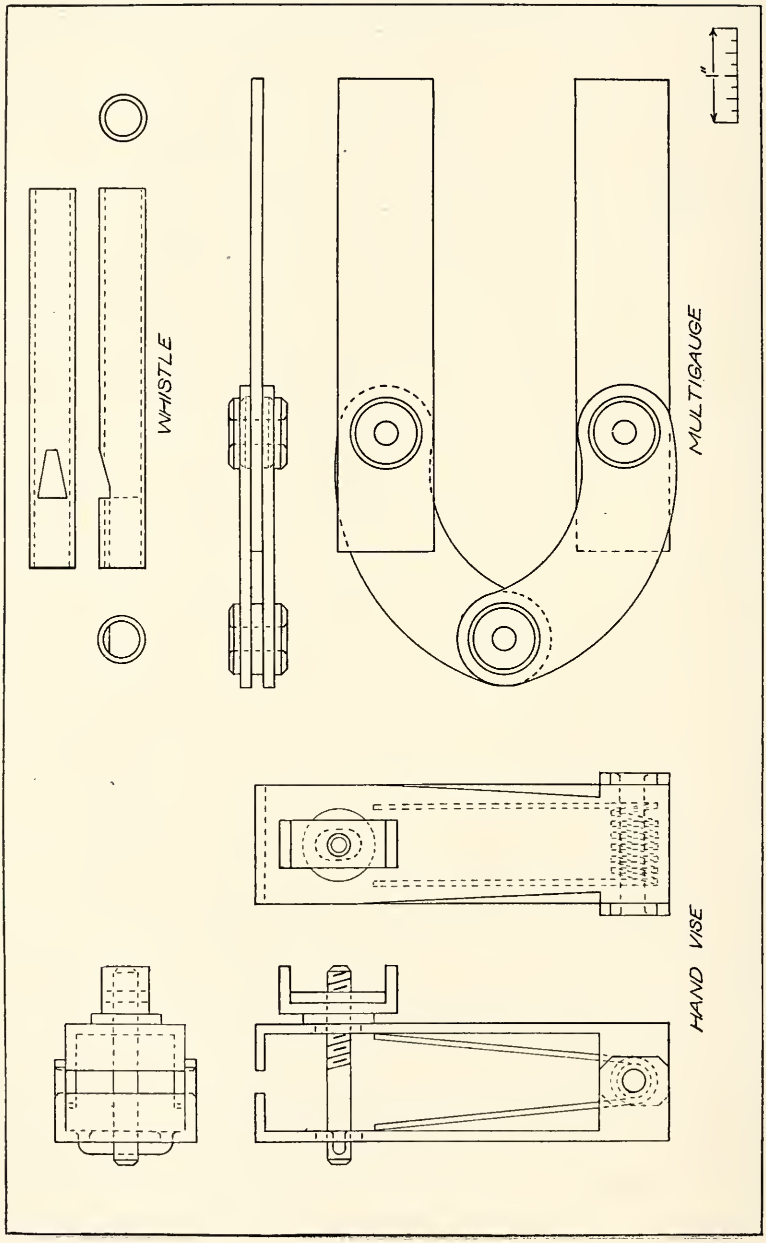
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present a considerable variety of work in order to make it interesting and to provide for the varying ability and interests generally met with in a class. For the average pupil a course would consist of six pieces with a certain amount of necessary note-book data. The six pieces are: (a) a straight edge or rule; (b) some form of punch; (c) outside or inside caliper; (d) square; (e) screw clamp; (f) level. Following is a brief outline of the work:

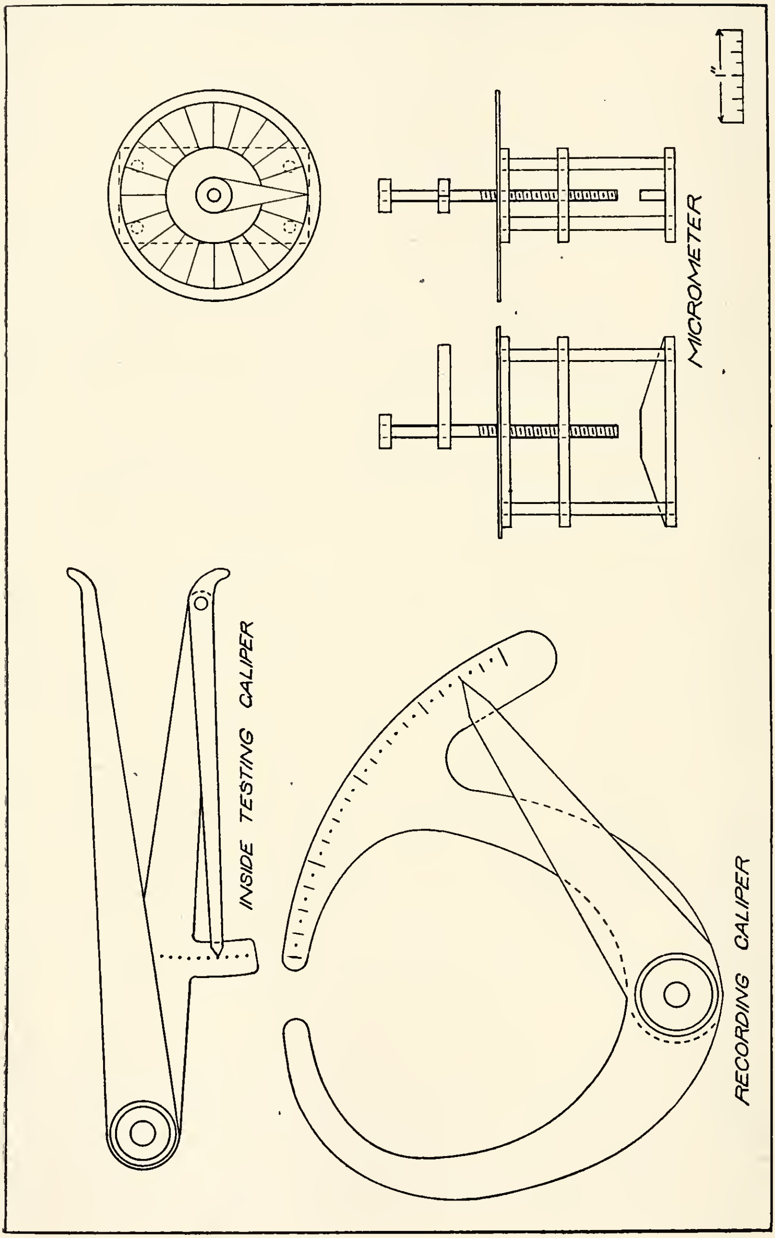
(a) Rule or straight edge.—Made of 12-gauge mild sheet steel. The tool operations are: laying out, gauging, hack-sawing, crease cold chiseling, coarse and fine filing, filing a flat surface true, filing a straight edge true to one-hundredth of an inch. The large straight edge with finger-hold requires the use of the breast-drill, 1/4-inch drill, and flat and round file. Polish with No. 1 1/2 emery cloth and grain with No. 00 emery cloth and oil.

(b) Punches; nail-set.—Made of 1/4 and 3/8 octagonal annealed tool steel. The tool operations are: filing rough stock to a true regular octagon, finding exact center at the ends, filing a taper to required dimensions, hardening and tempering.

(c) Calipers.—Made from 12, 14 or 16-gauge mild sheet steel, depending upon the size, which may be 4, 6 or 8-inch. Tool operations are: sawing and filing a piece with curved edges from the rough stock, accurate drilling, making a true disc (or washer) concentric with the drilled hole, filing circular bevel, countersinking and true riveting.

(d) Squares.—Required to make a square, that is true both inside and out to within one-hundredth of an inch. Even with the finer files, a fillet forms in the inside corner. This fillet is removed by either a scraping or engraving tool. In the smaller square, a 1/8-inch hole is drilled, then a slot is sawed to the hole. This has two advantages; first, it does away with the fillet; second, when testing with the square obstructions will not lodge in the corner of the square and impair the accuracy of the test.

(e) Clamp.—Material is 1/4 by 3/4-inch bar mild steel and 1/8 by 1/4-inch Bessemer steel rod. This clamp is used for holding securely parts to be soldered or riveted. Tool operations are: drilling, taper reaming, tap-drilling, and cutting of standard screw threads with die and tap. Brass muffs may be attached to the jaws by 1/8-inch brass rod rivets. The muffs are useful for holding delicate materials without marring.


INSIDE TESTING CALIPER
MICROMETER
RECORDING CALIPER
1"

(f) Level.—Material used is ⅛-inch sheet brass, and ½-inch brass tube, ⅛ and ⅜-inch brass rod and a ⅜ by 1½-inch bubble. Tool operations are: use of soft solder to join the two parts, working with sheet and tube brass, and accurate setting of the bubble with plaster-of-paris.

Among the special pieces is the hand vise, which is made of 12-gauge sheet steel. It is useful to hold any small work securely. Its construction provides many good operations, as sawing, filing, bending, drilling, countersinking, riveting, thread cutting, soldering, and spring making. The multigauge is useful for inside and outside calipering, comparison, transferring a dimension or angle, depth gauge and square. If desired, a tool half the size of the given drawing may be made. The inside testing caliper is graduated to tenths of an inch. It is used for calipering accurately inside to one-hundredth of an inch. When the pointer on the short left leg is moved one space upon the scale the extreme end of the left pointer leg moves one-hundredth of an inch, because the scale is in tenths of an inch and the ratio of the two portions of the pointer leg to where it is riveted is one to ten. The recording caliper is graduated to sixteenths. It is used for calipering and determining the size of an article without the aid of a dimensioned rule. It is especially useful in wood-turning for determining the thickness of a turned box or bowl. The micrometer is employed to measure accurately from .0015 of an inch to one inch and to determine the gauge of wire and sheet metal used in the shop. The threads upon the center screw are 32 per inch, so that one complete revolution of the pointer causes the screw to travel 1-32d of an inch. The dial is divided into twenty spaces, so that one space is 1-20th of 1-32d, or 1-640th, or in a decimal form .0015 of an inch. When a piece of common newspaper was measured in the micrometer, the pointer moved over two spaces on the dial, indicating that the paper was .0015 x 2 or .003 of an inch thick.

This brief contribution to the adaptation of work in cold metal to educational needs is presented with the hope that it may stimulate others to study the problem so that the work may be still further developed and applied and its possibilities realized.

THE EDUCATIVE VALUE OF MANUAL TRAINING.[1]

S. Horace Williams.

UPON the social-ethical side, also, manual training can exert a strong constructive influence. Every well-integrated society has certain customs, habits, modes of thought and ideals to which the individual must conform in order to retain his personal freedom under the law. Mind has no significance except as a guide to behavior and the conscience of a man represents his personal reaction toward these ideals and standards. In general, conscience is the crystalization of social habits in the individual,[12]—but this conscience must not remain an abstract entity and a vacant ornament to man. There must be harmony between thinking and doing. "He who does not know how to do, and can not image thru the experience of having done many things, can not enter into the spirit of humanity and appreciate how the people think and feel toward the duties it falls to their lot to perform." Society sanctions intelligent and honest work, encourages industry and originality as well as sustained effort; hence the child gains the best kind of moral training when he constructs by his industry, effort and comparative accuracy some project for use. Dewey[13] points out that manual training is an inevitable and indispensable introduction to the studies of the social group—history and geography, and the background of social endeavor. We may be sure that the training of the general intelligence which the child gets, his sense of reality, will arouse an interest in these matters,—bringing about a closer correlation between reading, writing and arithmetic.

For ages the school has prepared the child for the duties of life, on the *theoretical* side, but actually on the *practical* side, it has unfitted men for the duties of active life. School work has been far removed from the activities of the home and of society. The school has been an institution for the acquisition of knowledge of a non-functioning sort, especially so when considered with reference to all life except that of the scholar or of recluse. It is a natural conclusion then that academic training in such an isolated institution would not be primarily ethical, for the ethical refers to the standards of society. Some contemporary educators advocate a closer correlation between the life of the home and the community on the one hand and that of the school on the other, with the view of making education in the school a phase of life, not merely a preparation for some ethereal existence never to be lived, but only dreamed of in semi-waking states. Dr. Dewey[14] emphasizes this point when he says: "I believe that the primary basis of education is in the child's powers at work along the same general constructive lines as those which have brought civilization into being. I believe that the only way to make the child conscious of his social heritage is to enable him to perform those fundamental types of activity which make civilization what it is. I believe therefore in the so-called expressive or constructive activities as the center of correlation. I believe that this gives the standard for the place of cooking, sewing, manual training, etc., in the school." The work-shop is the place where the natural impulses for free activity best find expression;—work is placed upon a more humanistic basis and thought develops along lines which have marked social and racial progress. Knowledge and habits have an important place in constructive work, but doing is not all that is to be considered. Beyond the processes of doing and the acquisition of a fund of facts, the child gains appreciation and ideals. This aspect of manual work has been almost totally neglected, but under the influence of the social ideal and due largely to the Arts and Crafts movement, the appreciative element will hereafter assume its rightful place, at least in many progressive centers. Association with mixed classes in work, where there is a greater freedom in the exchange of ideas and mutual help, must inevitably produce a broader social consciousness and enable the children to appreciate manual work in many forms; the difficulties of construction, and the necessity for harmonious coöperation between all members of the group. When children work together in this coöperative spirit, they gain certain ideals and firmly established conceptions of the rights of the other fellow, which will be of inestimable value throughout life. These ideals will be those which have been the inspiration of the race in social progress, for society has advanced upon the principle that each must limit individual aggression for the welfare of the whole.

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[1] Continued from October, 1909, number.

[12] Elaborated in Prof. Paulsen's "System of Ethics."

[13] Dewey: School and Society; pp. 30-37.

CO-OPERATIVE WORK.

The constructive work of the shop has an especially rich social content when the pupils devote their efforts to the making of some project for use in the school. In some instances, students construct the furniture for the superintendent's office, make a book-case or furnish the woodwork for some festival. A good example of this sort of social work within the school is the printing done by the Ethical Culture School of New York City. Here the students print the programs, invitations and announcements for festival occasions; they print the report cards which are used by the school and many other forms for the use of the executive office. In the construction of furniture and in the printing, we find much group work, in which one of the students acting as a foreman, directs the operations, while the instructor has general supervision of the work.

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[14] Dewey: Pedagogic Creed; p. 11.

INFLUENCE OF MANUAL TRAINING UPON THE WILL.

Manual training has also a part in the training of the will. "Reflex, instinctive, emotional movements are all primary performances, but voluntary movements must be secondary functions of our organism. After a movement, having occurred in a random, reflex or involuntary way has left an image in the memory, then the movement can be desired again and deliberately willed. A supply of ideas of the various movements that are possible, left in the memory by the experiences of their voluntary performances, is the first prerequisite of the voluntary life. An anticipatory image then of the sensorial consequences of a movement plus the fiat that these consequences shall become actual, is the only psychic state which introspection lets us discern as the forerunner of our voluntary acts.[10] Movement is the natural, immediate effect of the process of feeling, irrespective of what the quality of the feeling may be. This is found to be true in reflex action, in emotional expression and in all voluntary life. Professor James says that the essential achievement of the will—when it is most voluntary—is to attend to a difficult object and hold it fast before the mind. This reduces the matter to the "effort of attention" as the essential element in the psychology of voluntary life. The paramount problem is to gain consent to the absolute and undivided presence of an idea in the mind. The only pure function of the will is to get this feeling of consent into the mind. The idea to be consented to must be kept from flickering and going out,—*it must fill the mind.* Such filling of the mind by an idea is consent to the idea. Now if this idea be that or include that of *bodily movement,* then we call the consent a *motor volition.* The terminus of the psychological process in a volition,—the point to which the will is directy applied—is always an idea.

These fundamental principles concerning the nature of the will give us a clue to the relation existing between motor training and the development of will-power. In the construction of a project, it is safe to assume that generally the child's undivided attention is devoted to his work. Concrete, logical ideas are held in his mind for the accurate construction of a project; irrelevant, foreign concepts are reduced to a minimum. Thought finds expression in that sort of activity which receives social sanction. Ideas which have been at the base of racial progress, along constructive lines and in those fields which have dealt with natural laws and forces,—these ideas are held constantly in the mind for the completion of some interesting and useful object. In this manner, the will is disciplined, power to attend to a central idea is developed and primary impulses are replaced by voluntary action of a higher order. By attending to facts in logical sequence during the processes of construction, power to reason along definite lines is increased. Thought processes are checked up by actual doing, hence there is a tendency to eliminate ideas which are not pertinent to the work in hand. Will-power, even along constructive lines develops very slowly, because there is a great deal of work done which tends to discourage the beginner. Self-confidence is often shattered by a single model. The standard, therefore, for every boy should be the best that he can do, not some foreign arbitrary ideal, which the teacher himself can not attain in many instances. True will-power should grow step by step, and be marked by success in a particular process. Will-power developed in this kind of work is of value chiefly along constructive lines, but may be of value anywhere else when *similar elements are involved.* For instance, suppose that the construction of a table involves training of the will along the lines of a, b and c. Another activity, playing ball—involves the elements c, d and e.[16] Training in the first activity, therefore, will render the agent skillful to the extent of the "c" element. Since modern manual training gives the child will-training along many lines, this training must inevitably render the child more efficient along lines which are not primarily concerned with constructive processes. *Only so far as there are common elements involved in any two processes, can skill in one aid in learning the other.*[17]

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[10] See Prof. James' discussion of the "Will," chap. XXVI, Briefer Course.

THE ECONOMIC VALUE.

If presented according to recent conceptions concerning the aims and opportunity of manual work, the manual arts give the child his initial training in the economic principles underlying many of the social activities in the environment. The child engages in the construction of a project which has some useful service to perform in the home, or in the school, or in the life of the child himself. Absorbing interest characterizes such work, and the associations in the shop rest upon a real and natural basis. When a group-project is made, the children work together with a common interest. This tends to induce mental unity among the children of various stations in life, and consequently to introduce feelings of sympathy and respect for the man who labors with his hands. Actual manual labor is seen at first hand to be respectable, dignified and honest in the highest degree. The conceptions of a child thus trained among children must necessarily be different from the ideas of children reared apart from economic activity in an environment where one class produces and the other consumes. Ideas gained in this manner will modify harsh criticisms in later life, when the children who worked side by side have become adults arrayed in two theoretically hostile camps,—that of the capitalist and that of the laborer.

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[16] See Thorndike: Principles of Teaching; ch. XV.

[17] Bagley: Educative Process; ch. XIII.

Where manual training is limited to the doing side, it fails to take advantage of a rich opportunity to introduce the child to many fundamental principles at the bottom of our industrial life. Here the child can learn much about the value of time, labor and materials. This phase of manual training has been worked out in Pueblo, Colorado,[18] where the boys are given cards to record data concerning the project under construction. The cost of material, the amount of time, at so much per hour, and facts concerning measurements are all carefully tabulated. This plan is carried out in detail also in Newton, Massachusetts. Each boy estimates the amount of stock to be used, learns the cost per foot, and then estimates the total cost of material, not only of the wood, but of all material put into the project. He records the date of beginning the work, and the time when he has completed the piece; then by charging so much per hour for his labor, he learns the cost of his project in respect to the amount of work put upon it. While not learning technically about the materials used, the child should know much about the most general and characteristic properties of the materials which go to make up his piece of work.

One of the basic principles at the foundation of our civilization is the conception of private property,—the sense of private ownership. So long has this been a racial trait that now it seems to be instinctive in the

[18] Hull: Value of Time and Material; MANUAL TRAINING MAGAZINE, Vol. IV, p. 161.

child, for many children early in life display the collecting instinct[19] and take great delight in the personal possession of many objects. In the manual training shop, each boy makes something which he is to own and use as he likes. This proves to be an incentive for good workmanship, for the average boy dislikes the destructive criticism of his playmates, or the disapproval of his parents. Thus ownership furnishes a deep motive for the best work which the boy can do. We can readily see that this is the soundest kind of economic training, for as adults, each man should work for what he possesses and designates as his own. It is notable that few children in the shop will accept the work of another, even though it be superior to their own. Unconsciously, they recognize their work as an integral part of themselves, and take pride in it as an expression of their individual thought and skill.

Despite the rich opportunity in manual training for the free expression of muscular and mental activity on the part of the child, the first forms of tool-work in this country were extremely formal, mechanical and barren of thought-content. Generally, throughout the country, the wood work has become less rigid and formal. Within the last few years, however, several progressive men have altered the courses of study by introducing projects and processes of the mechanical and industrial world about them. These men contend that civilization arose by virtue of the invention and use of tools, with which men could subdue the physical and animal world about them. Human needs, comforts and luxuries stimulated man's intelligence to keener insight into the laws of nature and enabled the brightest minds to invent machines and complicated tools for the performance of work which had been done in preceding times by manual labor on a small scale. This evolution of tools has required the maximum of thought and has been one of the most potent elements in the evolution of the race from savagery to civilization.

THE MECHANICAL PROCESS.

This group of educators, therefore, lays great stress upon the art and science of industry,—upon the tool-arts, and especially upon the mechanical and constructive processes of the environment.[20] Children are encouraged to observe and to study large, typical engineering achievements in the environment,—or to become interested in some phase of industry which can be studied in the neighborhood. Less time is spent upon pieces of furniture, and correspondingly more upon the construction of mechanical devices which will move or do work, such as electric engines, motor boats, water-wheels, bridges, derricks and moving cranes. Those who have observed children engaged in this sort of constructive work must feel the validity of the argument of the leaders who introduce it into their shop courses, for the children exhibit a degree of delight and enthusiasm scarcely found anywhere else. Those who hold to the culture-epoch theory feel that the child is recapitulating in individual mental growth the experience of the race, for as the race advanced from lower stages to higher by the use of tools, so too, the child grows mentally and physically by the manipulation of tools. So far, the leaders in this movement for a more vitalized form of manual training are just feeling their way, and while they feel safe in regard to their theory, they are at sea more or less as to the details of the work. In order to construct a mechanical device, they must reduce it to miniature size. When such a device is exposed to even the slightest use, it soon fails to work and becomes a wreck. Added to this, the making of such a project requires a great deal of time, the handling of many small pieces, which are often too small and complicated for the child to put together by himself. In fact, when completed, the work is little more than a fragile toy. It seems probable that either large durable projects must be made, which will stand exposure and use, or such work in the future will be limited to those grades which can appeal to the *dramatic instinct* of the child. In this case, a crude toy can be made which will represent much but require little time and material, with almost no technical skill involved.

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[19] G. Stanley Hall: Adolescence; vol. II, pp. 484, 485.

[20] A. W. Richards: The Thought Side of Manual Training; MANUAL TRAINING MAGAZINE, vol. III, pp. 61-79.

THE ART VALUE OF MANUAL TRAINING.

Another phase of the value of manual training is that which refers to the art aspect of the work. Students of this subject are beginning to demand work which has an artistic quality as well as sound construction. The craftsman of old had a deep-seated desire to do a piece of work in the finest way possible. When he had made use of all the rules and principles handed down from generation to generation by social tradition, he then depended upon his own mind, and under the white heat of an engrossing problem, produced an enduring work of art. Sound principles, skill, originality and pleasure in his work characterized such art of former ages. *Art and industry developed together,*—a fact which we should keep in mind when introducing either art or industrial work into the schools. From the time when the child first begins to construct, he should make something which has this artistic quality. In the manual training shop design must be an integral part of the child's productive work. He should make his sketch or design under the instruction of the teacher, then construct the project from his own design. Students should learn to think in terms of materials and of processes, two factors which will influence very much the design of an object. Dr. J. P. Haney, of New York City, believes that manual training must in the future become training in the manual arts and he makes the statement that the manual arts should include all forms of drawing, construction and design.[21]

"The instinct for harmony, proportion and beauty is fundamental. It seems to be in the order of things, inseparable from the human mind as now constituted. This love of the beautiful is probably transmitted from age to age by social heredity. The mind feels an attraction to those forms, colors and designs which have received social sanction and which have given expression to the highest ideals of man in the past. This feeling for the fitness of things has been expressed in all the multitudinous forms of creation,—painting, music, architecture, sculpture, literature, and in the hand-work of the craftsman." The arts regard this desire for beauty as instinctive,—a passion to adorn. Through such instinct, they would lead the child to learn the laws of fitness of form and decoration and to see such laws as they appear in the fine painting, or in the lowly form of daily use. The arts should be conceived as representing but varying phases of one idea. The arts would introduce the direct, objective methods of science-teaching to the pupil, would make the school-room itself a laboratory where plans would be thought out and experiments tried, would cultivate the child's active, not passive attitude, and would transform the class-room from a place of listening and rigidity to a place of doing and activity."[22] To separate art from the doing side then is to disregard the origin of art and to place it upon a false basis. Art should be the pursuit of the people, not the exclusive right of a small class of men who use the brush. In olden times, the designer was very often the artisan; beauty of construction and harmony in design evolved together. In modern times, however, the designer has been far removed from the man who constructs the object,—this being due largely to the introduction of machinery. Design has had little to do with the

[21] N. E. A. Report, 1903; p. 661.

[22] N. E. A. Report, 1903; pp. 658-664.

object upon which it was put. One of the ideals of the manual arts movement is to re-establish the true relationship which exists between the design and the construction of a project,—that is simply to unite again the artist and the artisan in one productive worker.[23]

It is in the field of the industrial arts that hand-skill and fine arts are obviously related and inter-dependent. In the preparation and serving of foods, in the planning and making of clothing, in the construction of homes, business houses, means of transportation and in various other conveniences serving the esthetic and practical needs of man, we find the common ground referred to,—the workable field for both the fine arts and manual training. "Applied design and art interpretation may well serve the manual training teacher,—the first deals with the size, form and color of construction,—the latter allows a universal application of art principles."

Design refers to the expression of form and color, including all kinds of construction, arrangement and decoration. Its chief purpose is to secure unity, simplicity and beauty and one must keep in mind the specific principles of balance, rhythm, harmony and variation. "Every design must be influenced and conform to the ideas of use to which the thing is to be put,—to the essential structure, to the materials of which it is to be made, and to its surroundings."

One should not forget that every great work of art has two distinct phases, the mechanical and the indefinable artistic quality. The former can be reduced to definite principles which can be learned from a textbook. These principles have evolved and crystalized with the progress of construction and underlie all great works of man. The latter is closely akin to what we term "feeling." A piece of work may be true to every mechanical principle and yet fail to be a truly great work of art because it lacks that delicate, elusive and indefinable quality which makes one say "I feel that there is something lacking".[24] It is very probable that this quality in a piece of work and a person's individual reaction toward it have a biological significane and could be traced back to the time when unicellular organism expanded toward pleasant stimuli and withdrew from the unpleasant and harmful. We know the instinct for harmony and beauty is deep in the human race, but such an explanation is only conjectural.

[23] See O. L. Triggs: Chapters in the History of the Arts and Crafts Movement.

[24] An unpublished essay by W. F. Vroom.

In a very suggestive essay on "Art as Related to Manual Training" Mr. James E. Addicott states the following conclusions:[25]

1. Art and manual training are fundamentally related, and should be so considered in elementary and secondary schools.

2. In all lines of industrial arts, hand-work and design may be advantageously correlated.

3. The double purpose of this correlation is to elevate and refine the work of the artisan, and at the same time to make the artist's work practical and essential.

4. From the pupil's standpoint, this correlation gives interest, reason and motive to both art and hand work.

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[25] Addicott: Art as Related to Manual Training; N. E. A. Report, 1906, p. 207.

(*To be concluded.*)

BOX TOP, DESIGNED AND INLAID BY STUDENT AT BRADLEY POLYTECHNIC INSTITUTE.

EDITORIAL

WE bring to the attention of our readers the new course for teachers recently adopted at Bradley Polytechnic Institute because its aim and scope recognizes a process of readjustment and unification which seems to be going on at the present time in the elementary schools of many of our progressive towns and smaller cities. As the interest grows in vocational manual training for the upper grammar grades, with the consequent demand for teachers with more technical training, the question of supervision for the manual arts work in the lower grades becomes perhaps more of a probem than ever, especially where financial resources are unduly limited.

Readjustment and Unification in the Lower Grades At the present time when a progressive superintendent wishes to establish work in the manual arts in his system of schools he employs (1) a supervisor of drawing and art work who has been well trained to teach these teachers with more technical training, the question of supervision for the manual arts work in the lower grades becomes perhaps more of a problem than ever, especially where financial resources are unduly limited. At the present time when a progressive superintendent wishes to establish work in the manual arts in his system of schools he employs (1) a supervisor of drawing and art work who has been well trained to teach these subjects in the high school, but overtrained in art and undertrained in teaching young children to be successful in the highest degree in the primary grades. He employs (2) a director of manual training who has been trained in technical woodworking, metalworking, and drawing, who may also know something of the elementary handicrafts and be able to give a few suggestions to the grade teachers, but he knows too little of the everyday problems of these teachers to be a good supervisor. The superintendent will also employ (3) a supervisor of domestic economy, or if he gets her from some schools, she will be still more highly specialized and will be called either a supervisor of household economics or domestic art. Each of these three supervisors may be well qualified to to teach his subject in the high school but, as a rule, not one of them is really a specialist in the lower grade work. This superintendent now has three supervisors in his lower grades whose special interests are in the upper grade or technical work. Moreover, their work overlaps more or less, yet no one of them could supervise what falls to the other two. Owing to this overlapping, to differences in point of view, training and experience, there is needless duplication and lack of harmony in their work—there is lack of harmony where there ought to be perfect unity, because all three of the lines of work belong together, and it should be a sin to subdivide them, especially in the primary grades. Moreover, the conscientious grade teachers are well nigh worried to death trying to serve so many masters.

What the superintendent needs is one supervisor who is first of all a teacher of children and then a specialist in *all* the manual arts for the elementary schools up to the seventh or eighth grade, or to the point where the vocational or secondary work begins under special teachers. Such a supervisor need not be qualified to teach any one of the advanced courses in the high school, but must have considerable skill in many arts and crafts, have sound pedagogical knowledge, power of organization, love of children, and tact in dealing with teachers. It is so evident that it need hardly be stated that such a supervisor must be a woman. Here, and not in the woodworking shop, is a place in manual training which belongs especially to woman. Such a supervisor would be one of the most important factors in any school system. The superintendents are calling for such, but none of the training schools can furnish them.

For these reasons Bradley Institute has organized a two-year course in which successful grade teachers may fit themselves to supervise art, manual training and domestic art in the elementary schools. Such a course ought not only to train some needed supervisors, but it ought indirectly to help in stimulating a readjustment in the organization of the manual arts which will be favorable to vocational training in the upper grades and unification in the lower grades.

The Time Schedule

A short time ago a teacher of manual training came to us and said: "If you hear of a good opening for a manual training teacher, I wish you would mention my name." We were surprised to hear this statement for we had thought of him as a good man in a progressive city, and getting a fair salary. "What is the matter," we asked, "Isn't Blank a growing city?" "Yes," he said, "it is a pleasant place, the equipment is good, the work is growing rapidly, and the people want me to stay, but I know that I am not doing the work there as it ought to be done, and I am tired of it." "But why don't you do what ought to be done?" we asked. And then he told his story. "The superintendent has cut up my daily program into short periods—some of them not more than thirty minutes—and expects me to teach every boy in the three upper grammar grades in the city once a week, besides helping the grade teachers in the construction work of the lower grades. I have only one vacant period in the week. Each day is one continuous rush and change of classes. It is impossible to do anything well. The superintendent is in favor of manual training; he wants me to extend it to cover every room in the city, but when I ask him for an assistant he says that he doesn't see that I need one."

What a deplorable situation! It is just such friends of manual training as this superintendent who are doing it great damage. Better take only the eighth grade boys for two lessons of an hour and a half each week and let the sixth and seventh grade boys go without shopwork than to make such a farce of the whole system. Then you can show results—good habits formed, power gained, definite knowledge acquired—which will in time lead to a demand for the extension of the instruction on a rational basis.

Compare the manual training time schedule in this city of Blank with the schedule in London or almost any other city in England, where each boy over twelve years of age receives instruction in manual training for either two and a half or three hours each week, and the teacher never has to teach more than two classes a day—two hundred boys a week. And isn't that enough? Who can teach more and teach them well? The more modern your pedagogy the worse off you are and the worse off the boys are if you exceed this number. We would prefer to make it a less number—say 150 boys in classes of 20, coming to the shop two one-and-one-half hour periods each week. Then the teacher could show results that are educational and in a broad sense vocational also. If the superintendents of some of our school systems would seriously consider the effects that come from chopping the shopwork program into small bits, they would soon revise their time schedules.

Cincinnati's Continuation School

The continuation school recently established by the school board of Cincinnati is sure to attract wide attention because it is a pioneer in its field and because it will demonstrate how the co-operation of manufacturers and school authorities may establish in this country a system of continuation school work which in time, may prove to have as many excellent features as the German system. In several German cities there is an ordinance requiring each master to allow his apprentices a prescribed number of hours each week in which they may attend a continuation school where the theoretical side of their trade is taught and general education continued. Cincinnati has no such ordinance, but the manufacturers have voluntarily agreed to do just what the German masters are required to do. They not only promise to pay the boys wages while they are under instruction, but they withhold the wages if the apprentice does not attend the school, thus making the schooling practically compulsory. Furthermore, the plan of the school is approved by the labor unions. The organization of all these forces on a practical working basis is a long step in advance and reflects much credit on Supervisor Ball, Superintendent Dyer, and the men of Cincinnati who have upheld them in their efforts.

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Our editorial on "The Munich Plan" in the October issue has been copied in full or in part by several educational journals and has brought forth a letter from Dr. Kirchensteiner himself containing the following statement which seems remarkable to an American school man: "Our school system in Munich directly prepares 95 per cent of the population, during the period between the sixth and eighteenth years of age, for the trades, commerce, and industry, and attempts to develop its pupils as far as possible in these pursuits. To be sure the extensive system of apprenticeship in Germany, which you do not know in the same measure in America, is of great help."

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Our editorial on spelling reform also called forth some encouraging letters. Henry Turner Bailey, editor of the *School Arts Book,* and Robert I. Clegg, editor of *Wood Craft,* have offered to co-operate with us in the extension of the three lists of words begun in the October number. In this work we shall need the help of our readers. Before December 20th we should be glad to receive words used in the manual arts in forms suggested for the lists. —C. A. B.

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"Manual training is the greatest thing that has come into our public schools. It is the one and only bridge over which the boy can walk into that world of activities he sees everywhere around him. Let us make that bridge as firm and solid as it possibly can be made, reconstructing every weak spot."—AMELIA HYDE CENTER in *The School Century.*

ASSOCIATIONS.

MINNESOTA EDUCATIONAL ASSOCIATION.

The Minnesota Educational Association met in annual session in Minneapolis, October 28-30, over four thousand teachers registering. The general meetings were held in the Y. M. C. A. Auditorium, the First Baptist Church, and the Commercial Club. The round table discussions were held at the Commercial Club, Donaldson's Tea Rooms, the Plaza Hotel, and the Handicraft Guild Rooms.

At the Friday afternoon meeting of the Manual Arts Section, chairman C. H. Barnes, of Ely, presiding, the following papers were presented and discussed: "Utility *versus* Art in Manual Training," by V. I. Sandt, Winona, and Leonard A. Williams, St. Cloud; "Manual Training in Grammar Grades," by Supt. R. B. MacLean, Fergus Falls; "Cement Work and Brick Laying," by Harvey J. Scharr, Ely; "Forge and Foundry Work," by Edward F. Geiger, Duluth; "Course in Sewing for Grammar Grades and High Schools," by Margaret J. Blair, College of Agriculture, Minneapolis; "Freehand Drawing, Handicraft and Design for High School Girls," by Adele M. Jones, Stout Institute, Menomonie, Wis.; and "Influence of Domestic Art and Science upon Home Life," by Miss H. C. Beecher, Albert Lea College for Women.

After a pleasant luncheon and social time at the Handcraft Guild the evening program consisted of the consideration of a course of study for grades 7 to 12. The discussion of the general topic was opened by Supt. Brown, of St. James, who spoke of the committee which has been at work upon the problem for two years past. The object has been to prepare a unified course of study which might be adopted for use in the schools thruout the state.

The following papers were then presented, each illustrated by stereopticon slides: "Preliminary General Statement," by J. E. Painter; "Woodwork and Mechanical Drawing in Seventh and Eighth Grades," by Terence W. Gilbert; "High School Shopwork, Freshman Year," by George A. Moore; "Wood Turning, Pattern Making and Foundry Work," by Ray L. Southworth; "Forge Work and Machine Shop," by DeCloise Glasby; "Mechanical Drawing in the High School," by Laurens L. Simpson.

Upon recommendation of the committee on nominations, the following officers were elected for 1909-10: President of Manual Arts Section, Supt. R. B. MacLean, Fergus Falls; Secretary, Ray L. Southworth, West High School, Minneapolis. —E. B. DILLINGHAM, Red Wing, Minn.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The Seventy-ninth Annual Meeting of the British Association for the Advancement of Science was held at Winnipeg, Canada, Aug. 25 to Sept 1. Leading men from all branches of the sciences were present from the various parts of the Empire and from the United States. In the Educational Science Department the following papers were of exceptional interest:

1. "Aims of MacDonald College," by Principal J. W. Robertson, St. Annes De Belle View, Quebec.

2. "Practical Studies in Elementary Schools," Dr. W. H. Heller, Superintendent of Schools, London, England.

3. "Manual Instruction in Elementary Schools," Walter Sargent, Chicago.

4. "London Trade Schools," Dr. C. W. Kimmins.

5. "Practical Work in Evening and Continuation Schools," W. Hewitt, Manchester, England.

6. "Education and Experimental Psychology," Prof. Hugo Munsterberg.

In connection with this section two splendid exhibits were on view, consisting of work in clay, basketry, weaving, carving and furniture construction by the primary schools of Winnipeg, and school drawings illustrative of nature study and school life in England.

The next meeting of the Association will be held in Sheffield, Eng., during the first week in September, 1910. —S. S. NEWTON, Winnipeg, Can.

NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

December 1st, 2d and 3d have been selected by the National Society for the Promotion of Industrial Education as the days upon which to hold their annual convention. The place selected is Milwaukee.

An exhibition of trade school work from all over the United States will be one of the features of the convention.

State branches of the Society have increased in number during the past year. Massachusetts and New York alone have more than 200 members each enrolled on their lists.

The Society has issued its Bulletin No. 9 which contains all the addresses delivered at the last annual convention held in Atlanta.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The October Bulletin has been issued announcing the personnel of committees for 1909-10, also a list of publications of the Association. This list includes the Annual Reports which are for sale, and several articles and committee reports which have been reprinted in pamphlet form for free distribution.

At the business meeting of the Association, held in St. Louis, May 1909, the invitation to hold the next meeting in Minneapolis was accepted. The exact date of the meeting will be given in the next bulletin.

Minneapolis has splendid facilities for the meeting of the Association, both as to lecture halls and space for exhibits. The work of the local committees has already been started, and everything promises a most successful meeting.

Extra copies of the bulletin may be obtained upon application to the secretary, Bertha L. Patt, State Teachers College, Cedar Falls, Iowa.

THE MANUAL ARTS CLUB.

The program for 1909-10 of the Manual Arts Club of Minneapolis has been received. At the October meeting the general topic was "Industrial Training as a Civic Force." "The Normal Boy," was presented by Carleton Burrier; "The Abnormal Boy, Exemplified in Reformatories," was presented by W. W. Hill and George F. Hale.

The topic for the November meeting was "Industrial or Trade Schools in Other Cities;" "Educational Standpoint," by W. D. Robertson; "Business Man's Standpoint," by George H. Elwell, President Board of Education; "Parent's Point of View."

At the February meeting Miss Agnes I. Lodwick will discuss "Design in Its Relation to Construction," and George A. Moore, "Construction, Its Possibilities and Limitations."

"A Normal Drawing Course in the High School" will be discussed at the March meeting by Miss Roberts and Miss Lillian E. Mathias. Followed by "Correlation of Design with Domestic Art," by Miss M. Attie Souder.

On April 15th there is to be an "Exchange of Hostilities" at Central High School. The president of the Club is Theo. W. Breckheimer, North High School; secretary-treasurer, Laurens L. Simpson, Central High School.

ILLINOIS MANUAL ARTS ASSOCIATION.

Plans are partially completed for the seventh annual meeting of the Illinois Manual Arts Association at Jacksonville on Feb. 18 and 19. The program will include an address on German and French Schools by Charles A. Bennett. This will be illustrated by stereopticon. Walter Sargent, Head of Manual Arts Department, University of Chicago, will also give an address. Mr. Sargent's experience as Agent for Promotion of Industrial Drawing in Massachusetts should make his address especially valuable to supervisors and teachers of the manual arts, as he has been for so many years in close contact with the various phases of the work in both city and country. Supt. M. M. Mallory of the State Industrial School at Pontiac will describe the interesting work done there. The Course of Study Committee with Mr. Crawshaw as chairman promise an interesting report. It is also hoped to have a round table on Manual Arts in the Rural Schools. A prospectus of the meeting will be ready to mail about Jan. 1st.

CURRENT ITEMS.

CLINTON S. VAN DEUSEN, Editor.

Items on industrial and trade schools will be a special feature of this Department in the February number. Readers are invited to send in such items not later than Dec. 25th, giving details of general interest.—ED.

TEACHERS COLLEGE EXHIBIT.

The annual exhibt of woodworking at Teachers College in June was arranged in four booths made by crossing two partitions thus: +. Each one of the angles constituted a "room," the color scheme and decorations of which were prepared by the class in interior decoration and the furnishing was made up from pieces of furniture made by the class in woodworking for secondary schools. The most elaborate group (Fig. 1)—made by one man—consisted of a roll top desk, typewriter table and revolving chair. The smaller pieces in this room were made by others.

One group (Fig. 2) was made of mahogany, most of the pieces by women. The tables and chairs in Fig. 3 were also made by women.

The same plan has been carried out that was tried last year, namely, each student at the beginning of the year chooses a set of articles to be designed and made by himself, in the making of which must be included the principal forms of furniture construction. This gives unity and adds interest to his work, and the product, when done, has considerable value.

Other similar pieces are shown in Figs. 5 and 6. Figs. 1, 2, 3 and 4 are from photographs by Rockwood, New York, the others by William Noyes.

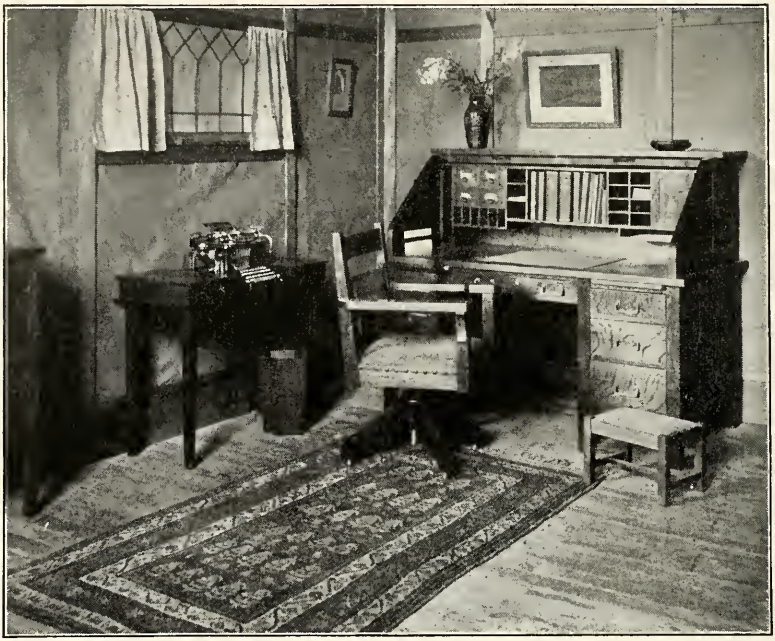
NORTH ATLANTIC STATES.

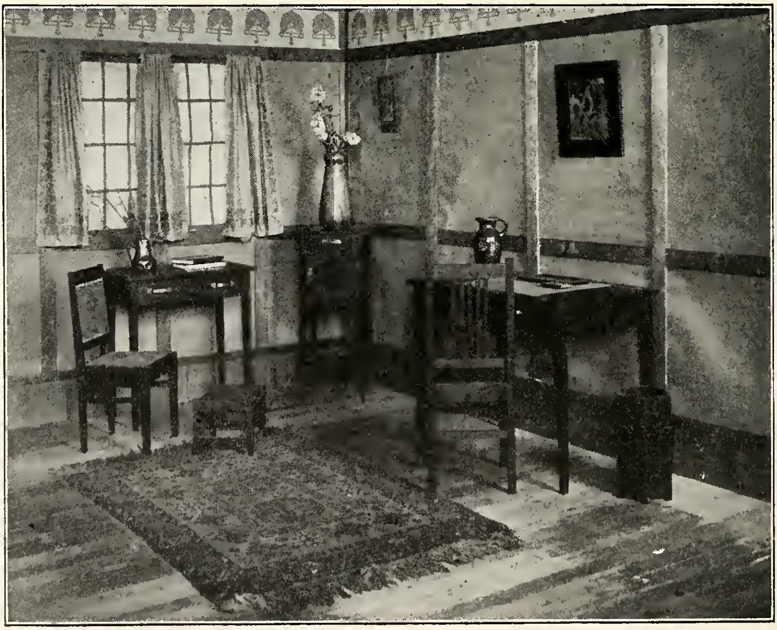
Herbert L. Berry, one of the veteran teachers of manual training, has resigned his position in the Gorham (Maine) Normal School to retire from the profession. Mr. Berry is best known thru his work at Westbrook, where his teaching attracted considerable attention for a number of years.

Manual training was introduced last year in the schools of Bellows Falls, Vt., with an equipment of benches and tools costing about $500. Whittling is given to the boys of the sixth grade and benchwork to those of the 7th, 8th and 9th grades. This was the first place in the state to start the work and much interest is shown in it.

Brattleboro, Vt., has started manual training with an equipment costing about $150. The work is given to the boys of the 7th, 8th and 9th grades one hour each week. The girls have sewing at the same time under a special teacher.

Boston has opened four new manual training rooms this Fall, one in the Edward Everett School, an additional room in the Dudley School, one in the Bishop Cheverus, and one in the Old Mather. A new room is being fitted up in the Brimmer District.





FIGS. 1 AND 2. TEACHERS COLLEGE EXHIBIT.

The new Technical High School building at Newton, Mass., was opened on September 13th with five hundred pupils, and when it is fully equipped, it will be admirably adapted for its purpose. Charles L. Kirschner, for several years director of the Boardman Manual Training High School in New Haven, was elected two years ago to take charge of this school. With Mr. Kirschner's knowledge of the needs of manual training schools, the architect was enabled to work out an exceptionally good plan. When complete, the plant will cost not less than $500,000, and will accommodate about one thousand pupils.

Manual training has been started this year at Passaic, N. J., with Terrence W. Gilbert in charge.

Louis C. Butler, Channing W. Gilson and James X. Warren are new teachers in the manual training department of Jersey City, N. J. They come from St. Louis, Rock Island and New York City respectively.

The School of Industrial Arts, in co-operation with the State Normal School at Trenton, N. J., is preparing to educate teachers of drawing for the public schools of the state. Courses relating to the science of education and the art of teaching will be given in the Normal School, and courses in drawing, painting, designing and modeling in the School of Industrial Arts.

NEW YORK.

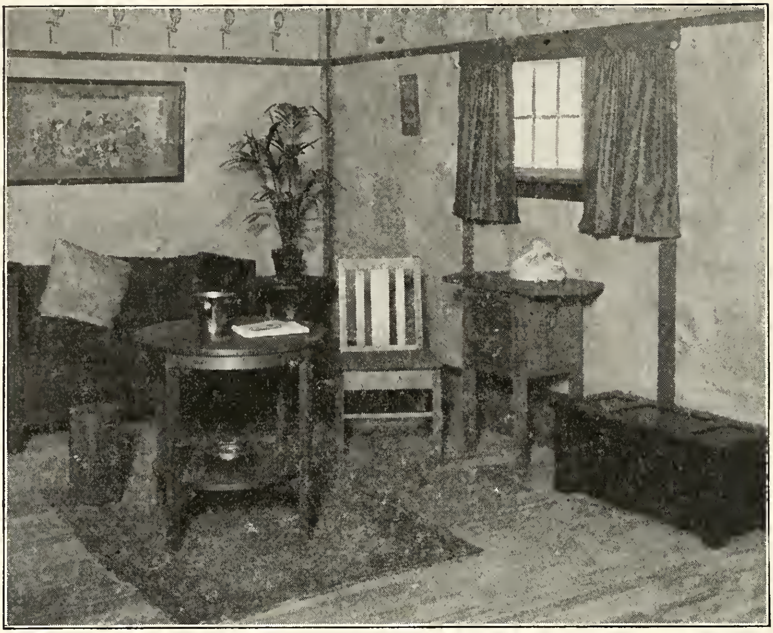
At Glens Falls benchwork is given in the 6th, 7th and 8th grades ninety minutes each week and a special class meeting an extra hour after school will soon be organized for boys of ability or for those deeply interested. Work is also open to all years of the high school; one, two or possibly, in exceptional cases, three periods per week, the amount of time being optional. Almost one-third of the high school boys elected it two periods per week or one hundred and eighty minutes. One room is used for all classes. The equipment for it cost about $1,000 and much more is being spent to put the room in shape. Total expenditure for manual training and domestic science will probably reach $4,000. This first year woodwork and drawing only are given with a little individual instruction in lathe and copper work.

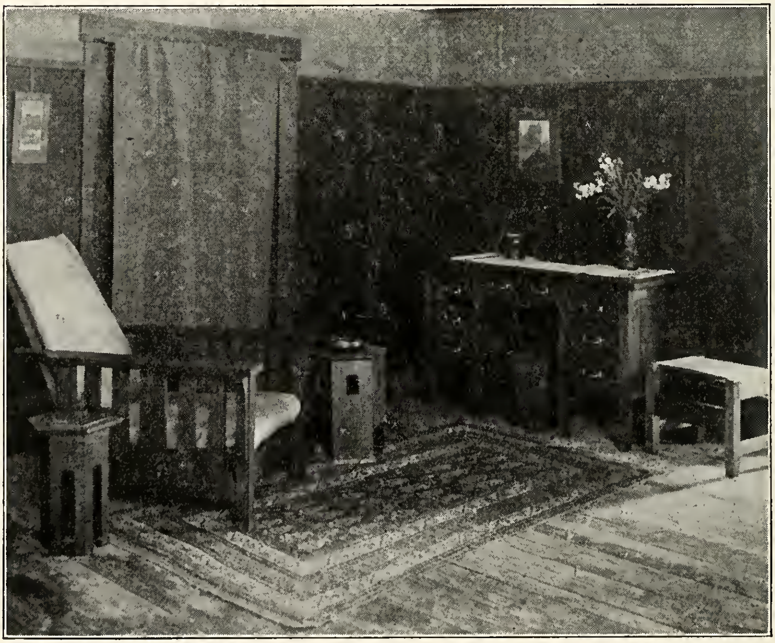
After a valuable experience in mining engineering in West Virginia, Charles B. Howe is back at the Stuyvesant High School, New York City.

Daniel Upton, who organized manual training in Buffalo over fifteen years ago, and under whose care the Department of Manual Training has grown from one grammar school shop to thirty-nine grammar school shops, equipped for woodworking, one vocational school and a technical high school, has gone to a larger field as principal of the Buffalo State Normal School. Francis H. Wing is his successor as director of manual training.

A. S. Hurrell is the new principal of the Technical High School. Mr. Hurrell was first assistant to Mr. Upton, having had charge of the science department in this school. J. H. Nyenhuis, formerly a grammar school instructor, takes H. V. Stoddard's position in the pattern shop.

Elmer S. Pierce is principal of the new vocational school, Conrad Weiffenbach has the shopwork in the same school, and S. F. Ball, Geo. A. Beck, Arthur Solomon, John A. Hislop, and George Palmer are new grammar school teachers in Buffalo.





FIGS. 3 AND 4. TEACHERS COLLEGE EXHIBIT.

W. Ralph Woodward is a new teacher of manual training in the high school at Ithaca.

Gifford Lawton comes to Niagara Falls to teach manual training in the public schools.

Jerome King comes to Olean to supervise the manual training work.

L. A. Wilson has become principal of the Rochester Factory School. This school was started Jan. 1, 1909.

Manual training has been started at Dobb's Ferry, under the direction of Wm. Coffrey.

Samuel R. Spurr comes to Lancaster to organize an industrial school in that town.

E. Byron Bayne, formerly the supervisor of manual training at Adrian, Michigan, has charge of the manual training department at the Country Branch of the Orthopaedic Hospital and Industrial School, at White Plains. The school has a very complete equipment for benchwork, wood turning, forging and metalwork.

J. J. Eaton, formerly supervisor of the trades schools at Manila, P. I., is now teaching manual training at Yonkers.

Miss Nettie E. Service is organizing the manual training work in Rockville Center, Long Island.

SOUTH CENTRAL STATES.

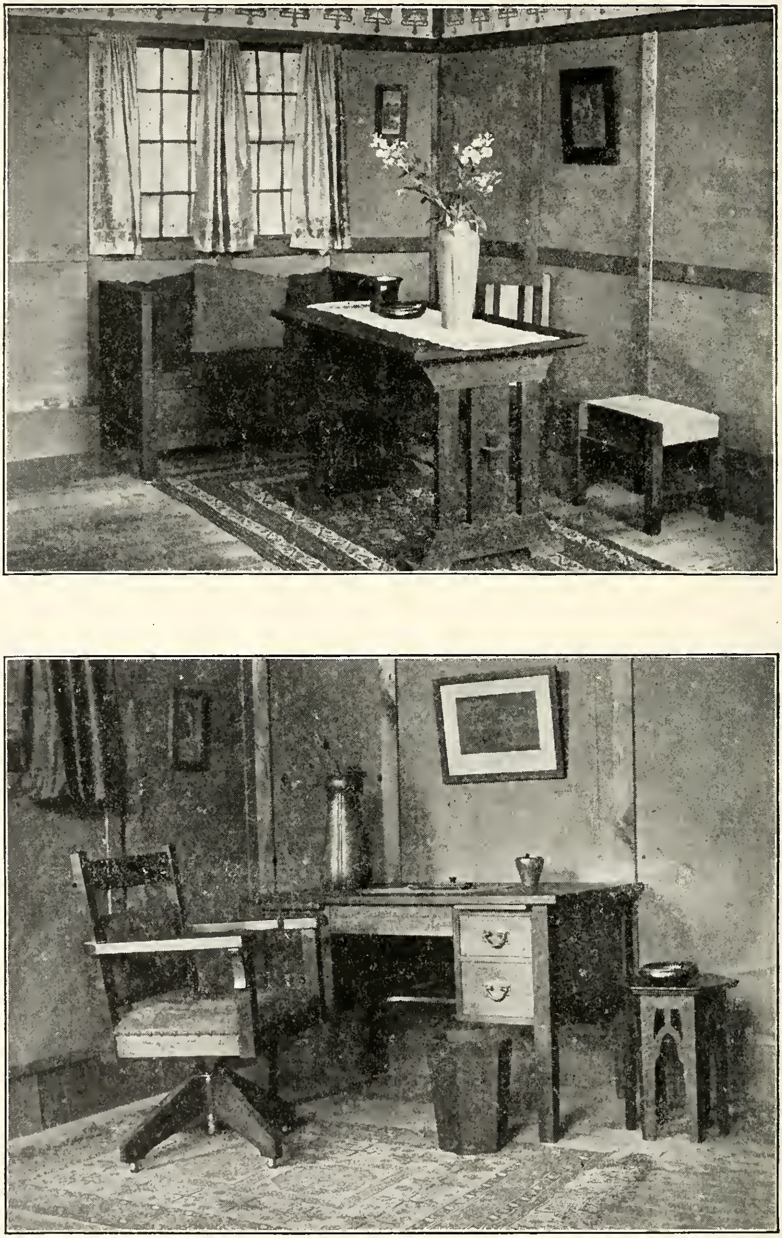
Duncan, Okla., has started manual training in its high school with an equipment of fifteen benches and necessary tools. The entire equipment cost about $225. Chas. H. Dillon has charge of the work.

TEXAS.

The Sam Houston Normal School at Huntsville is the first state normal in Texas to instal manual training and domestic science, and the results have greatly surprised everyone connected with the schools. It was found necessary to
greatly surprised every one connected with the schools. It was found necessary to
the entire senior class elected manual training. This is a very interesting outcome to those who have watched the growth of this subject in the state. The last Legislature caused manual training, domestic science and agriculture to be given in the three normals. The Sam Houston Normal is the only one which complied this year. A large manual arts building is in course of construction now to accommodate these departments. Arthur B. Mays has charge of the manual training, and Miss Thomas of Teachers College, N. Y., has the domestic science.

Galveston has started manual training this year by equipping three shops at an expense of about $8,000. Only woodworking is given at present and the lowest grade in which it is being started is the fourth. Orville A. Tearney is in charge of the work.

Two new centers have been opened in Houston this year—one white and one colored. Each has been supplied with a $500 equipment. The equipment is for cardboard construction, Venetian iron and sheet metal work, and wood-



FIGS. 5 AND 6. TEACHERS COLLEGE EXHIBIT.

work. Work is given in the four upper grammar grades an hour and a half a week. This gives Houston ten white centers and two colored centers. Two of her centers have been opened to night classes in mechanical drawing and woodwork. Special attempt has been made to secure the enrolment in the drawing classes of apprentices from the many manufacturing establishments of the city. C. F. Lamy has been added to the teaching force.

At Fort Worth provision has been made for the 7th and 8th grade manual training work of the city in the new Eleventh District building. Four rooms of this building are devoted to manual work. The shop is equipped with twenty-four benches, a bench saw, a turning lathe, a grindstone, tools, a motor, etc., costing about $900. The drawing room is equipped with twenty-four drawing tables each containing six lockers and six boards. The equipment for this room cost over $400. The work in these two rooms is in charge of Mr. Ledford. There are also rooms for cooking and sewing.

About $700 exclusive of freight and cost of installing, has been expended at Brownwood for providing equipment for benchwork and mechanical drawing. Provision is made for eighteen pupils in each line of work and Fred McEachron is in charge of the work. Each succeeding year it is planned to add lathe, forge and machine work as the pupils become ready for it.

NORTH CENTRAL STATES.

Within the past six months Toledo, Ohio, has opened fourteen new manual training centers fully equipped for thirty girls and twenty boys. This makes a total of nineteen centers out of a total of forty school buildings. During the past summer nine centers were used for vacation schools. Twelve hundred and nineteen boys and girls took advantage of this opportunity to do shopwork, cooking and sewing. The experiment was a great success and next year more centers will be opened. There was no set outline of study in this work, in fact an effort was made to get away from the regular school year work, the idea being to work out projects and recipes, etc., not contained or encountered in the daily school outline, thereby holding the interest of the children and at the same time not conflicting with the next year's course. Many children do not have the chance to leave the city for a vacation, and many cannot find work. It was for this class of pupils that the schools were opened. Classes were held every morning. Public playgrounds were also established at these centers. The grounds were looked after by special teachers who instructed the children in games and looked after their general welfare. A very interesting account of the vacation school will appear in the annual report of the Board of Education.

Woodworking and mechanical drawing for the boys and sewing and cooking for the girls have been introduced this year in the schools of Sandusky, Ohio. The equipment for the boys cost about $4,000 and that for the girls about the same amount.

E. A. Filbey, formerly of Armour Institute, is now instructor of woodworking at Chicago University.

The Manual Training School of the Odd Fellows Orphans' Home of Illinois has been established this year at Lincoln, Ill., and an equipment costing about

$1,500 has already been provided for woodworking and about $1,000 will soon be expended for additional machines. There has also been about $400 expended for equipment for mechanical drawing. The work is given to boys of the 7th and 8th grades and high school and as this is the first year they are all starting in about the same way and their work will be varied as they advance. Ninety minutes a day are devoted to the benchwork and from one and one half to three hours a week to mechanical drawing.

Manual training has advanced rapidly in Springfield, Ill., during the past few years and this year the Board allowed $2,000 for a start on a machine shop. Work is now given in their high school in woodworking, including turning and pattern making, forge work and machine shop work.

Independence, Mo., is equipping the last of its six schools for manual training work so that it will not be necessary for any pupils to leave their own building for this work. The equipment for this shop will cost about $350. The high school is also well supplied with an equipment costing about $2,500. In Independence the art supervisor plans all manual work for the first four grades and the supervisor of manual training plans the work above the fourth grade. In the 5th grade cardboard construction is given, and in the next three grades sewing is given to the girls and benchwork to the boys, two hours per week being devoted to the above work. In the first year of high schood advanced benchwork or furniture making is given and in the second year wood turning; forty-five minutes per day is devoted to the work.

That the work started last year at the Normal College at Wayne, Neb., has been favorably received, is shown by the fact that the privileges of the department have been extended to the boys from the 6th to the 12th grade in the public schools. These boys come to the shop one hour and twenty minutes each week and are under the direction of the regular teacher, Mr. Huntemer, who has V. V. Sears, a graduate of last year's class, as an assistant.

T. M. Wood, who for two years past has been in charge of the Labette County High School, is teaching forging in the State Normal Manual Training School at Pittsburg, Kan.

Salina, Kan., has built a fine high school building, equipping it with $3,000 worth of machinery for manual training.

John McBride of Topeka, Kan., who has been director of manual training there since the installation of that department has moved to Seattle. Superintendent Whittemore takes Mr. McBride's place at Topeka.

Wichita, Kan., expects to build a new high school and equip thoroly for manual training and domestic science. The old high school building will be used to assemble the 8th grades under special teachers and the practical courses are to be extended.

MICHIGAN.

Crystal Falls has started manual training this year with an equipment costing about $1,000. Knife work is given in the 5th grade, benchwork in the three upper grades and cabinet work and turning in the high school. The work is compulsory in the grades but optional in the high school. Over ninety per cent of the high school boys are taking the work.

Miss Ruth E. Watson has recently been appointed a teacher of manual training in Moffitt's Private School at Grand Rapids.

The new high school built this year at Negaunee contains five large rooms for manual training. This being the first year that Negaunee has had manual training only two subjects, woodworking and mechanical drawing, were taken up. Woodwork is carried on in grades five, six, seven and eight. The first year high school students have four periods of ninety minutes each a week, two for joinery and two for mechanical drawing. Wood turning will be given during the second semester. Metal working and pattern making will be introduced as soon as the students are ready for that work. The woodworking room is equipped with twenty-four benches, each bench has two vises and an individual set of tools. Planer, buzz saw, band saw, grindstone, and turning lathes with a ten horsepower motor constitute the woodworking machinery equipment.

In mechanical drawing the school furnishes twenty-four outfits, each composed of a drawing desk which has six individual master-keyed locks, a general drawer, one set of drafting instruments, two triangles, one transparent ambrolined T square, one boxwood rule, drafting board, ink, pencil, thumb tacks and paper. Drafting work will be carried in higher grades as students advance.

MINNESOTA.

There are in Minnesota one hundred and twenty-seven schools offering manual training and fifty-nine schools offering domestic science.

Lynn D. Rockwell has charge of the manual training work in the Shattuck School at Faribault.

Anoka has engaged J. A. Secor to take charge of the manual training work in the 7th and 8th grades, also the high school. They put in domestic science this fall.

Dale W. Nicolen is in charge of the manual training at Crookston this year.

At Pipestone, Miss Mabel Reid is the manual training instructor in the 7th and 8th grades and the high school. They have an equipment of twelve benches. Sewing was introduced in the 5th, 6th, 7th and 8th grades this fall.

Minneapolis has added three new grade centers in manual training and domestic science. These are in the Prescott, Jackson and Hawthorne buildings.

Red Wing has installed domestic science and agriculture this fall and the manual training department has added three woodworking lathes and a five horsepower motor to their equipment. Carolyn Salisbury is instructor in domestic science. A new industrial building is under construction and will be under roof by the holidays. This will be the first purely industrial building in this state.

Janesville has introduced manual training in the 7th and 8th grades and high school and sewing in the 6th and 7th grades.

Manual training has been introduced in the 7th and 8th grades and high school at Sherburne, with W. H. Stone as instructor. Sewing is also given in the grades.

Manual training is taught in the 7th and 8th grades of the schools of New Richland, and in the 7th and 8th grades and high school at both Slayton and Lyle, all three places having equipments of twelve benches.

Manual training has been introduced in the 7th and 8th grades and high school at Waseca. Sewing is also given in the grades.

F. E. Matteson is instructor of manual training at Blue Earth, where the work has been introduced this fall with an equipment of fifteen benches and the necessary tools.

The following places have introduced manual training and domestic science this fall with the instructors named in charge of the work: Hinckley, Chas. Robertson, manual training; Marie Henegren, domestic science; McIntosh, Leo Le Duc, manual training, Mary K. Hartzell, domestic science; Alexandria, A. M. Foker, manual training, Elwin Full, domestic science; Canby, O. M. Kiser, manual training, Ethel Ferraby, domestic science; Cokato, A. H. Leidenberg, manual training, Daisy S. Hour, domestic science; Glencoe, A. D. Bailey, manual training, Emily M. Thomas, domestic science.

IOWA.

The manual training department in the Sioux City schools has been strengthened by the addition of F. E. Yeager of Purdue University as instructor in mechanical drawing in the high school and W. H. Clarke as instructor in woodworking in seventh and eighth grades, while R. C. Kelley continues as supervisor. New equipment this fall includes six motor-head speed lathes for the high school and a new room with full equipment as a grade center.

Oscar Chaney of Parsons, Kan., comes to Davenport.

Manual training is now taught in all grades of the schools of Nevada. The entire equipment cost about $600, twenty benches being provided for the work.

Manual training was introduced this year at Manning, where an equipment costing about $175 was purchased. Woodwork is given in the 7th and 8th grades and the high school.

The following towns in Iowa have started manual training this year: Iowa Falls, Emmetsberg, Hawarden and Webster City.

THE DAKOTAS.

An equipment costing nearly $8,000 has been placed in the Central High School building at Grand Forks, N. D., this year, in which the boys of the 7th and 8th grades and high school are taking the work. The equipment includes thirteen motor-head lathes and the following machines with individual motors: planer, jointer, universal saw, band-saw, and grindstone.

Manual training has been introduced in the public schools of Mayville, N.D., this year. The work was put in for the grades and high school, beginning in the sixth grade with woodwork for the boys and sewing for the girls. The same is true in the high school, and as this is the first year, the high school boys are all doing about the same work. The grades and high school are using the same room and equipment. Fourteen benches with the necessary tools are provided, the cost of which was something over $200. H. F. Butterfield of the State Normal is supervising the work.

Frank H. Selden, formerly instructor in woodwork at the University of Chicago, is now in charge of manual training at the State Normal School at Valley City, N. D.

The department of manual and industrial arts of the Northern Normal and Industrial School at Aberdeen, S. D., has been greatly enlarged during the past summer. The remodeled industrial building has fifteen thousand square feet of floor space and contains shops for wood, metal, forge and foundry work on the first floor and rooms for freehand and mechanical drawing, elementary manual training and applied design on the second floor. $5,000 has been expended for new equipment. The department has two assistants under the direction of H. W. Mansfield and more assistants are to be added during the winter terms when many young men come in for the trade courses in carpentry and blacksmithing. These courses begin in November and continue for sixteen weeks and are designed primarily to meet the needs of the young men from the rural districts who are able to attend school only during winter. Instruction is given in the common branches and special work in carpentry or blacksmithing and horseshoeing. These courses have been a great success and last year more young men desired the work than could be accommodated.

County Superintendent L. C. Kellogg of Lake County, South Dakota, has put one bench in a rural school as an experiment.

WESTERN STATES.

Helena, Mont., has improved its manual training equipment somewhat by the addition to its high school shop of a planer, a universal saw bench, a mortiser, a lathe, and a large power grindstone. Motor power and all shafting and countershafts as well as the motor have been placed in a small basement prepared in order to avoid overhead shafts. Omar T. Sadler of Onekama, Mich., has been added to the manual training force and is teaching the upper grade pupils.

Manual training has been introduced for the grades at Bozeman, Mont., this year and Butte has greatly increased its equipment for high school work in manual training by putting in about $3,500 worth of machinery.

Sewing has recently been introduced in the public schools at Colorado Springs, Colo. The work is under the supervision of Miss Sarah J. Dowdle. All of the girls of the 5th and 6th grades are taking sewing, having one half day every two weeks.

The Salt Lake High School has equipped a room for sewing, and arrangements have been made for two years of needlework in connection with the domestic science course which was introduced last year. Miss Tracy, the instructor in charge of the sewing, reports that nearly one hundred girls have enrolled in her classes.

The Riverside School of Salt Lake City was provided with a manual training shop at the beginning of the present school year. With the opening of this shop, Salt Lake City has every grammar grade school in the city supplied with facilities for the proper execution of manual training work.

At the last meeting of the Board of Education most of the manual training teachers of Salt Lake were given substantial increases in their salaries.

Mr. Craft, who a few seasons ago was engaged as an instructor of mechanical drawing at Pratt Institute, is now occupying a like position in the Salt Lake High School.

About $1,000 has been expended this year in extending the work of the mechanic arts department of the State Normal School at Albion, Idaho. Lathes, a band saw, down-draft forges, a small machine shop equipment and drafting instruments were the main things purchased.

E. Gesswein, formerly a teacher of manual training of New York, has been assigned to take charge of the shop work at the Oquirrh School, Salt Lake City.

Manual training has been started in the schools of Pocatello, Idaho. Benchwork, turning, and drawing are given and the work extends from the 6th grade thru the high school. Mr. Seivers has charge of the work.

James R. Forden who has been supervisor of manual training at Walla Walla, Wash., now has charge of the department of manual training for men in the State Normal at Cheney in the same state.

CALIFORNIA.

Los Angeles has just voted $750,000 worth of school bonds. About half of this amount is for the erection of a new polytechnic high school similar to the one they now have.

Riverside has equipped for high school work, putting in lathes, forges, etc. They have had the work in the grades for a number of years.

Santa Monica has added a course in wood turning, having installed new lathes.

Hollywood high school has installed a very complete outfit. They have fourteen motor driven lathes, a new universal saw table, and expect to equip with other power tools very soon. They have just voted $100,000 bonds for the erection of a new building and expect to put in a complete polytechnic course.

Compton high school has installed manual training, doing only first year benchwork this year.

Ontario has put benchwork in its high school this year.

FROM HANDICRAFT GUILD, MINNEAPOLIS.

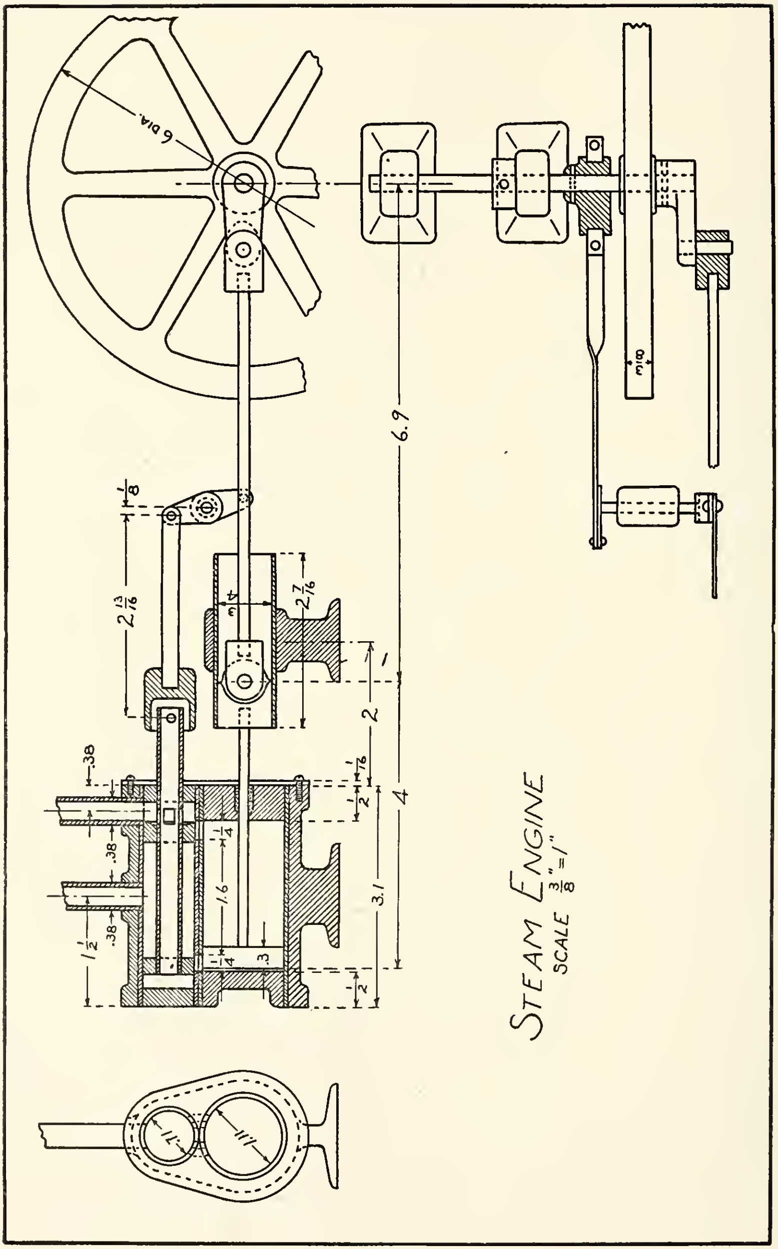
SHOP PROBLEMS.

George A. Seaton, Editor.

STEAM ENGINE.

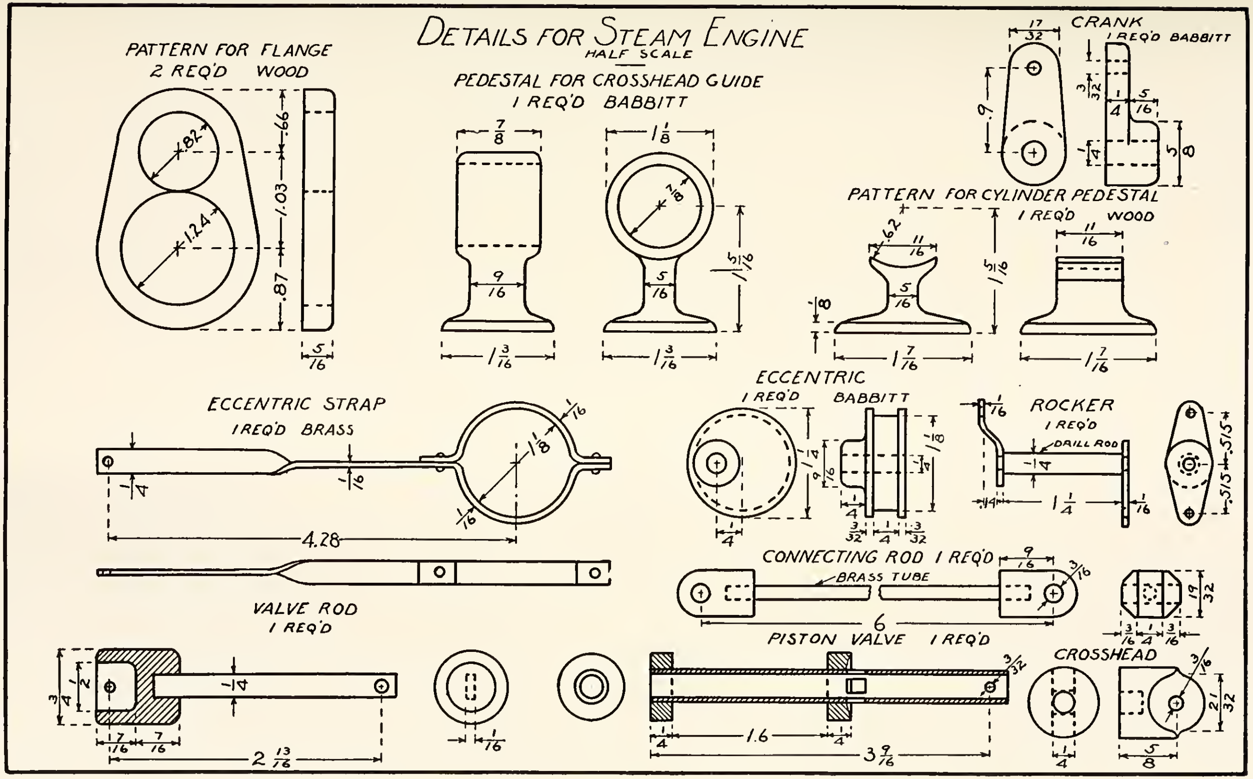
The drawings of a steam engine which can be constructed entirely by hand tools have been contributed by D. K. Hiett, Pittsburgh. The drawings are much more formidable than the problem itself and a little time spent in studying the matter out will convince one of this. In studying the drawing, note that in the front view where the rocker apparently connects with the connecting rod, it in reality joins with the eccentric strap which is directly behind the connecting rod and is not indicated in the front view. The support for this rocker is also not shown in the front view, but is indicated in the plan view. With this suggestion, the remainder of the drawing can be quickly understood.

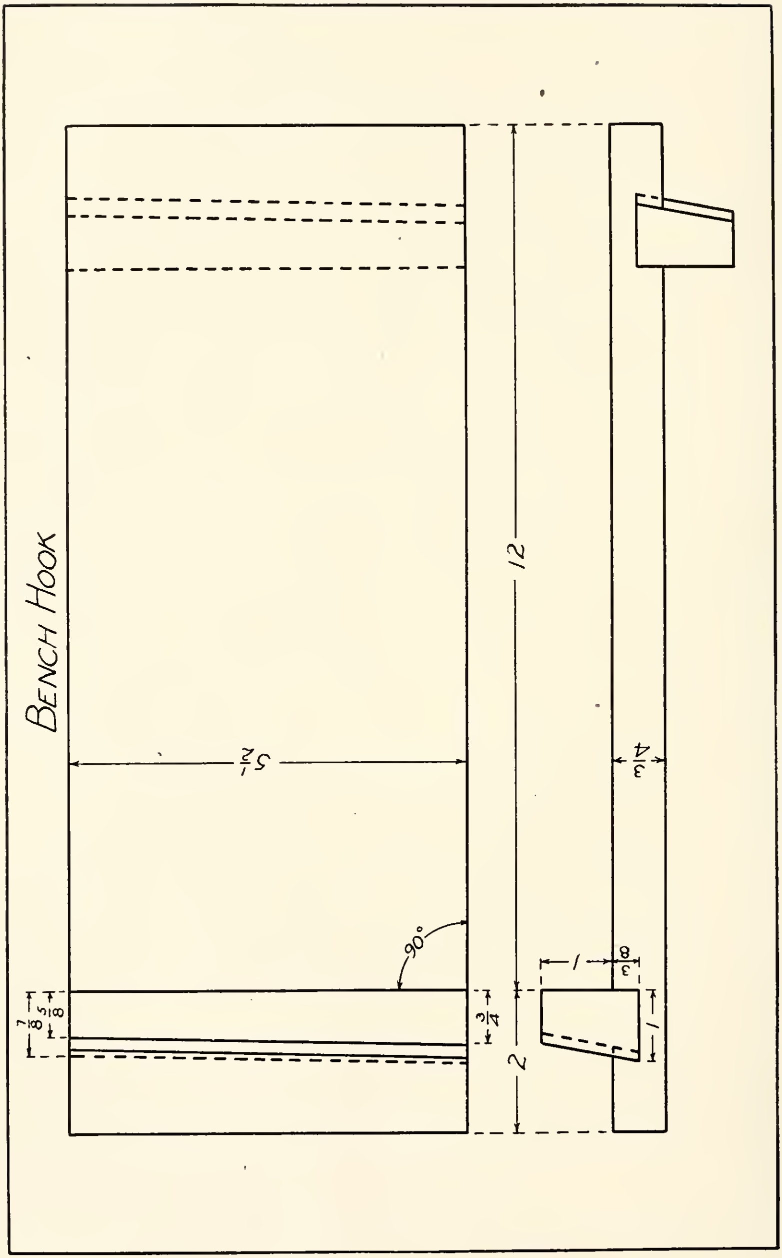
The entire engine is constructed from brass tubing, a few pieces of drill rod and a number of white metal castings made in plaster of paris moulds. Slight variations in measurements which are sure to result in building the engine can be corrected by necessary adjustments in assembling. Such an adjustment will be needed in the case of the piston valve. The eccentric should be made first and after its throw is measured the length of the rocker arms can be determined which will give the correct movement of the valve. The eccentric should also be made a tight fit on the shaft so that the adjustment can be made for lead. To construct the cylinder, two tubes of the correct size and about four inches long should be secured together by wooden flanges placed the proper distance apart and at equal distances from the ends. Two tubes for steam and exhaust should be fastened in their proper places by filing the holes to receive them a tight fit. The place between the flanges is built up by layers of string to a depth of $\frac{1}{16}$ of an inch. The pattern for the cylinder pedestal can be held in place by means of this string and glue. The string can now be covered with beeswax and given a coat of shellac. This built up pattern with the ends of all tubes plugged should be placed in a shallow box and plaster of paris should be poured around it up to the center of the tubes. After this hardens, a print is taken in a similar way of the other half, the two being held in the proper position by pins. After the plaster dries the pattern should be removed and the two tubes for the cylinder and steam chest inserted in their places. These tubes should be about $\frac{1}{32}$ inch longer than the finished cylinder in order that they may hang in the prints made by the pattern. The steam and exhaust tubes should be in place and the ports should be filed or drilled in, with small pieces of plaster inserted to form cores. When the mold is in place the babbitt is poured in around the tubes and will hold all securely in place. The cylinder is then removed and the ends filed down to the proper length and the whole finished with emery cloth.

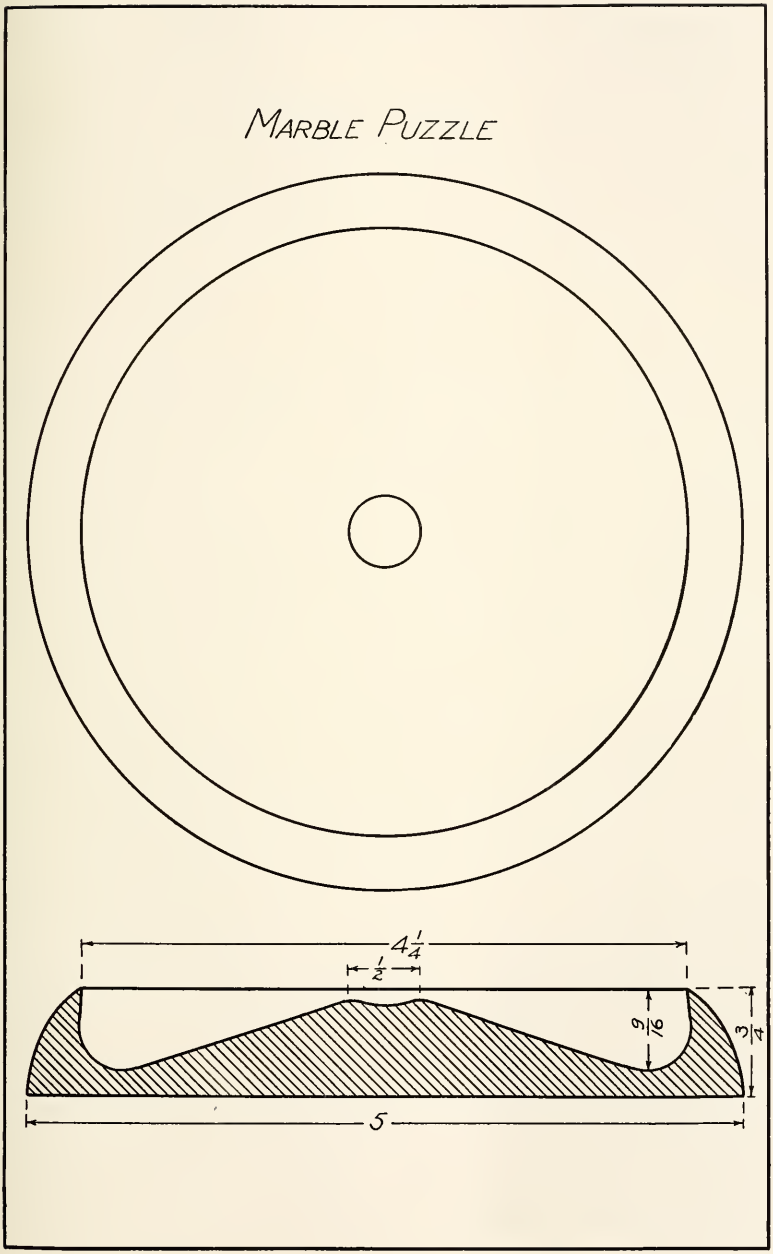


STEAM ENGINE
SCALE $\frac{3}{8}'' = 1''$

6 DIA.
6.9
4
2
1
$2\frac{13}{16}$
$2\frac{7}{16}$
$\frac{3}{4}$
$\frac{1}{8}$
$\frac{3}{8}$
.38
.38
.38
$1\frac{1}{2}$
1.6
3.1
$\frac{1}{16}$
$\frac{1}{2}$
$\frac{1}{4}$
$\frac{1}{4}$
.3
$\frac{1}{2}$
1.1
.7


DETAILS FOR STEAM ENGINE
HALF SCALE
PATTERN FOR FLANGE
2 REQ'D WOOD
.82
1.24
.66
1.03
.87
5/16
PEDESTAL FOR CROSSHEAD GUIDE
1 REQ'D BABBITT
7/8
9/16
1 3/16
1 1/8
7/8
5/16
1 5/16
1 3/16
CRANK
1 REQ'D BABBITT
17/32
.9
3/32
1/4
5/16
1/4
5/8
PATTERN FOR CYLINDER PEDESTAL
1 REQ'D WOOD
.62
11/16
5/16
1/8
1 5/16
1 7/16
11/16
1 7/16
ECCENTRIC STRAP
1 REQ'D BRASS
1/4
1/16
1 1/8
1/16
1/16
4.28
ECCENTRIC
1 REQ'D BABBITT
1 1/4
9/16
1/4
1 1/8
1/4
1/4
3/32
1/4
3/32
ROCKER
1 REQ'D
DRILL ROD
1/16
1/4
.14
1 1/4
1/16
.515
.515
VALVE ROD
1 REQ'D
CONNECTING ROD 1 REQ'D
BRASS TUBE
9/16
3/16
6
19/32
3/16
1/4
3/16
PISTON VALVE 1 REQ'D
3/32
1/4
1.6
1/4
3 9/16
3/4
1/2
1/4
7/16
7/16
2 13/16
1/16
CROSSHEAD
3/16
21/32
1/4
5/8


BENCH HOOK
12
2
5 1/2
3/4
90°
1
3/8
1
7/8
5/8
3/4


MARBLE PUZZLE
4 1/4
1/2
9/16
3/4
5

The piston valve, piston and other castings are made in a similar way, the rings being cast on the tubes and kept in place by the skrinkage of the metal as it cools. If a lathe is available the piston valve and piston may be cast large and turned down, but if care is taken they may be cast directly in the tubes and rubbed down with emery cloth to a sliding fit. The crosshead guide is made of a piece of tubing and is formed similarly to the cylinder. The eccentric strap is bent around a rod of the correct size. The cylinder heads are cast in the tubes, allowing plenty of clearance for the rod. The packing for the piston rod is held in place by a brass plate on the end of the cylinder. This plate is held on by screws which form their own threads in the soft metal. For a boiler a plain cylinder holding about half a gallon and fitted with a simply constructed safety valve will be found sufficient.

BENCH HOOK.

Rather out of the usual is the form of bench-hook which has been tried out by J. Louis Crisp of the Trenton High School. He has used the problem in the first part of his high school work and finds that it furnishes a brief review of all the tool processes and adds an introduction to dovetailing. The cross strips are gotten out one inch longer than the finished dimension, which makes it possible to drive them to a tight fit even tho there may be some inaccuracy in the making of the groove. The ends of the cross strips are trimmed even with the board after they have been driven into position. If it is desired, one of the cross strips can be cut back from the right hand edge of the board as usual, tho this is not shown on the drawing. The method of construction used makes possible a bench-hook without screws, brads or glue to dull the edge of tools handled by careless students.

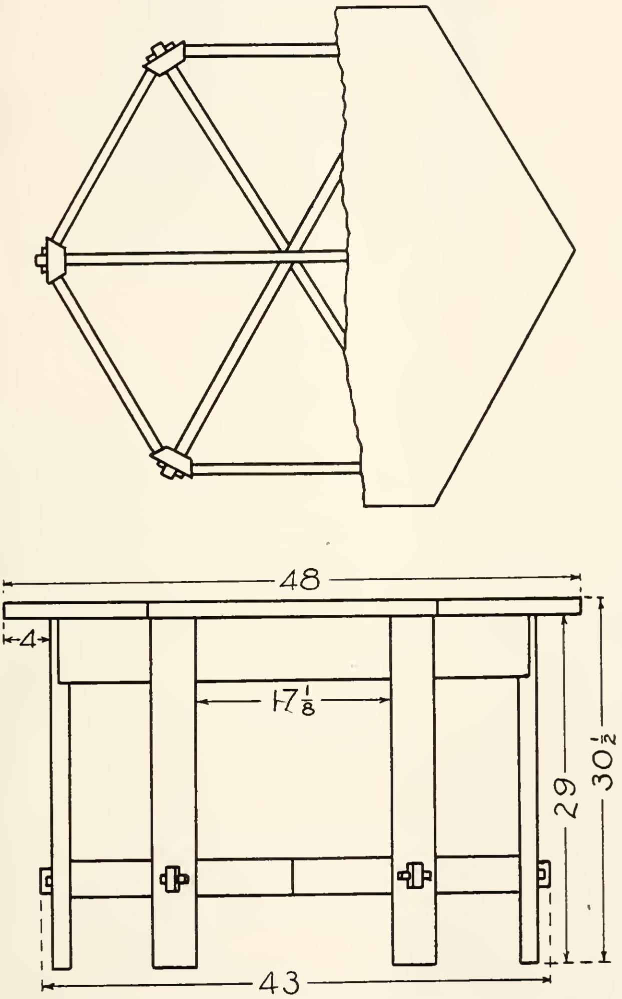
MARBLE PUZZLE.

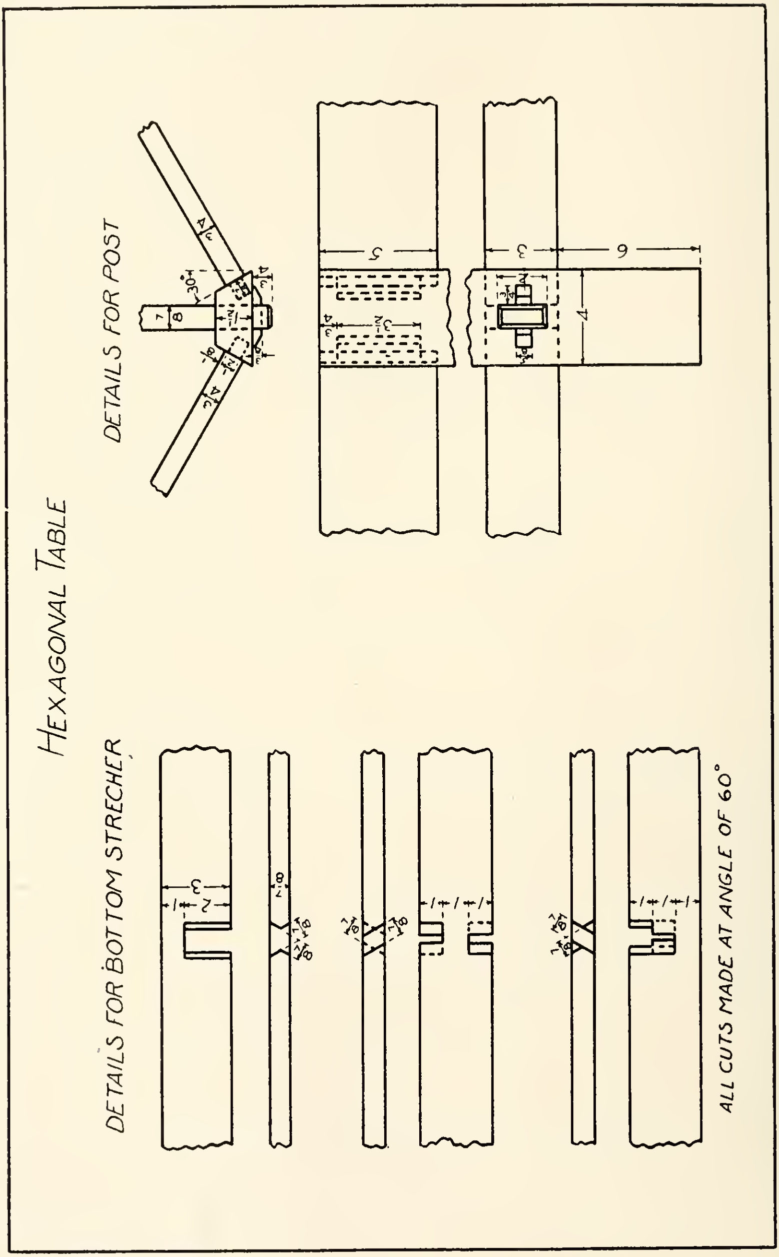
This simple puzzle furnishes an easy problem for face-plate turning. In making it, after it has been reduced to its proper thickness and the outer edge finished, the groove is hollowed out and from it a low sloping cone is made to rise, having its vertex on the same level as the original face of the piece. This point is then cut away to leave a depression which is just deep enough to hold a marble and no more. The puzzle is held in one hand and an ordinary marble running in the groove is then urged to take its central position in the slight depression. If this can be accomplished without any outside aid the puzzle has been successfully solved. If the marble comes too easily to this central position, it is an indication that the depression is too great and it should be lessened.

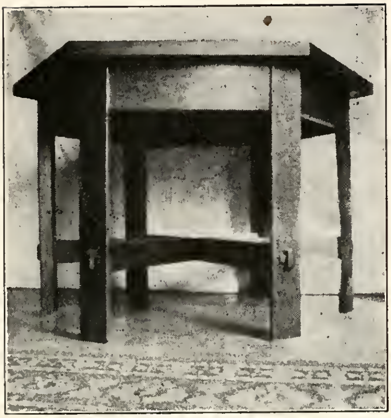
HEXAGONAL TABLE.

One of the students of the Central High School of Minneapolis has designed a hexagonal table which may serve as an inspiration for some other of the better workers. The fitting together of the three cross strips or stretchers is interesting and would require careful workmanship to be successful. The drawing was submitted by L. L. Simpson.

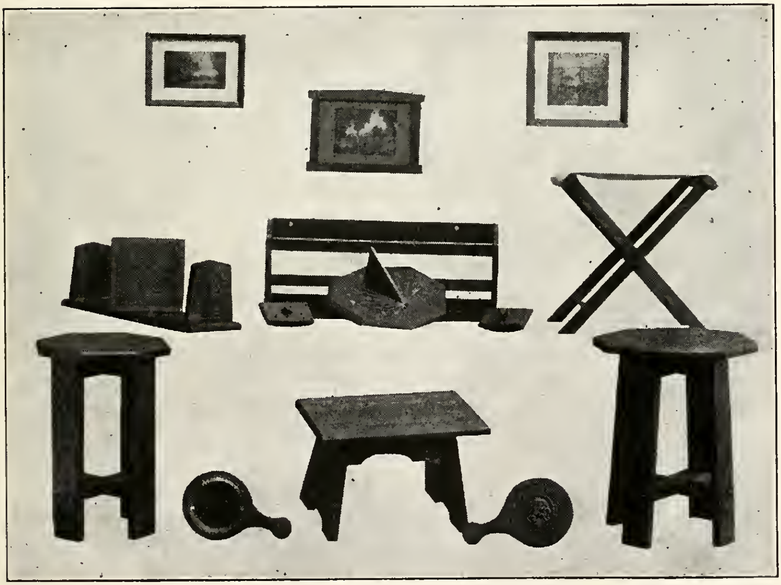
HEXAGONAL TABLE


48
4
17 1/8
29
30 1/2
43


HEXAGONAL TABLE
DETAILS FOR POST
DETAILS FOR BOTTOM STRECHER
ALL CUTS MADE AT ANGLE OF 60°
30°
3/4
7/8
1/2
1 1/2
5
3
6
4
2
1



CENTRAL HIGH SCHOOL, MINNEAPOLIS.



WORK OF 7TH AND 8TH GRADE PUPILS, INDIANAPOLIS.

REVIEWS.

Metal Spinning. By Fred D. Crawshaw, Assistant Dean, College of Engineering, University of Illinois. Published by the Popular Mechanics Company, Chicago, 1909. 4¾x7 in.; pp. 72; bound in boards; price 25 cents.

This book deals with a fascinating subject in a manner which is delightfully clear and satisfying. In his introduction, Professor Crawshaw frankly admits that in its competition with the various processes of stamping and pressing now so commonly employed to form sheet metal into shapes desired, metal spinning in many of its applications has been forced to yield, and that metal spinners are, in this country at least, difficult to find. He makes it clear, however, that metal spinning as an art is well worth preservation. Not only does it have its uses in manufacturing when the number of pieces required of any given form is so small as not to justify the construction of dies in which to press them, but it is capable of serving the craftsman in the production of articles which in form and artistic quality can not readily be produced in any other way. The several chapters following the introduction describe the lathe and the tools, all of them simple, required for the practice of the art, the metals most serviceable for spinning, and a series of graded exercises by the use of which any one may gain proficiency in the art of metal spinning. The forms involved by these exercises range all the way from shallow dishes of simple outline, to vases, pitchers, etc., of excellent design; in fact, one source of charm presented by the book is to be found in the grace and beauty of the examples of spun work which it presents. —W. F. M. Goss, University of Illinois.

Wood Turning. By George Alexander Ross. Published by Ginn & Co., 1909. 6¼x7¾ in.; pp. 76; price, cloth, $1.00, by mail, $1.05.

This is a treatise on the subject of wood-turning prepared for the use of students in manual training high schools, technical schools and colleges.

The first part of the book deals briefly with the development of the lathe from the simplest, most primitive forms, through its various changes and modifications up to the modern motor head and gap lathes. A detailed discussion of the different parts of the lathe is also given. This part of the book is well illustrated and clearly written.

Following this are a few pages devoted to the explanation of the different turning tools and the method of sharpening, and then the main part of the book contains a list of fourteen exercises in turning, beginning with the cylinder and including such articles as chisel handle, candle stick, mallet, napkin ring, box, rolling pin, card receiver, etc. The making of these articles involves the various methods of turning between centers, face-plate work, chucking, etc., and the method of procedure in each case is explained in detail. The drawings are clear and well made, but the photographic illustrations are small and not so clear as might be desired. Following this is a series of thirteen supplementary exercises consisting of such articles as policeman's club, Indian club, plate, picture frame, bowl, etc.

The book ends with an appendix which consists of a discussion of the various methods of finishing woods. Directions for making and applying a large number of different stains and finishes are given. This part of the book should be of interest to teachers who have not had a large experience in finishing woods.

The book is a welcome addition to the few good books on the subject of wood-turning. —Charles H. Bailey, Iowa State Normal School.

Freehand Perspective and Sketching. By Dora Miriam Norton, Instructor in Perspective, Sketching and Color, Pratt Institute, Brooklyn, N. Y. Published by the author, 1909. 7x10½ in.; pp. 173; price, $3.00.

At last we have an attractive book on perspective which seems to give the teacher just the help he needs to make this often obscure and dry subject full of meaning and life. Miss Norton is not satisfied with merely stating a principle, because she knows from her experience in teaching that this is not sufficient; nor does she stop with a single illustration and a few words of explanation. On the contrary she uses numerous illustrations showing the various applications of the principle to different forms and in different positions with reference to the eye, and explains in detail each new application of a principle.

The book consists of a series of exercises with explanatory text, covering the subject in such a way as to develop power to draw not only from objects, but from memory and from descriptions. In the preface Miss Norton says: "The principles and methods thus set forth have been taught by the author for some years in the above school and have been found practically effective in that direction." The book is clear and comprehensive, beautifully printed and well bound.

—C. A. B.

Mechanical Engineering and Machine Shop Practice. By Stanley H. Moore, Director of Mechanic Arts, McKinley High School, St. Louis, Mo. Published by Hill Publishing Company, New York, 1908; 6x9 in.; pp. 502; price, $4.00 net, postpaid.

This book is the outgrowth of the shop notes which the author has used for several years in his classes in machine shop practice. These notes have been revised and reviewed by other teachers in different parts of the country and now appear in book form. They are not tied to any course of study and are comprehensive enough to constitute a valuable book of reference for the man in technical work as well as a student in school.

The book covers: I. Introduction and equipment, in which the author discusses the care of the shop, the machines, the check system, record system, etc. II. Materials—metallurgy of iron, pig iron, cast iron, wrought iron, steels, alloys, etc. III. Friction, Lubricants and Lubrication. IV. Cutting Tools—cutting edges, feeds and speeds, hand tools, lathe tools, planer tools, tool holders, etc. V. Measuring and Small Tools. VI. Screw and Pin Data—taps and die, screws, bolts, nuts, rivets, etc., including many tables of data. VII. Bench and Vise Work—laying out, hammering and sawing, threading and tapping, chipping, filing and files, scraping, keys, fits and fitting. VIII. Turning—lathes, straight and taper turning, etc. IX. Boring—machines for boring, chucks, boring bars, etc. X. Drilling—machines for drilling, kinds of drills, drill shanks, sockets and collets, drill chucks. XI. Grinding. XII. Planing. XIII. Milling. XIV. Miscellaneous Machine Tools and Accessories—presses, dies, turret machines, jigs, templets. XV. Shop Processes and Kinks—coloring iron and steel, cleaning castings and forgings, soldering, sweating, brazing, etc. XVI. Mechanics—work, power, heat, power graphs and computations. XVII. Power-Generating Machines—steam engines and turbines, gas, oil and hot air engines, hydraulic motors. XVIII. Elementary Electricity. XIX. Power Transmission. XX. Motor Drives and Motor-Driven Machine Tools.

The book is well written, well printed and well illustrated. —C. A. B.

Modeling in Public Schools. By Walter Sargent. Published by J. L. Hammett Company, Boston, 1909. 6x8¼ in.; pp. 31; price, 60 cents.

As one opens this book for the first time he is much pleased with it because it is well printed on heavy paper, the half-tone illustrations are pleasing, and each of the subjects selected for illustration tells a story of method or suggests a type of work that is practicable in the schoolroom. As he reads it, too, he finds sound theory and many suggestions for supervisors and teachers who know the art of modeling. But as one reads and then re-reads he wonders why the author did not go a step further and make the book complete enough in detail to be of service as a practical handbook for teachers who are not working under expert supervision, but have a desire to use modeling as a medium of expression in their schools. In reading the suggestions for the grammer grades, where the technique of modeling is an important factor, one is constantly wishing for more of the practical details. One wishes he knew just how the author would have the work done. Modeling is a subject about which too little is known by the grade teachers at the present time. We welcome Professor Sargent's book as another means of promoting this subject in the schools, and especially for its suggestions concerning methods and subjects for the primary work, but we wish the book were more complete. —C. A. B.

The Manual Arts for Elementary Schools. By C. S. Hammock and A. G. Hammock. Published by D. C. Heath & Co., Boston, 1909.

This is a series of eight books "dealing with drawing, design and construction in their proper relations." It is planned "to help in making art in the schools more practical and manual training more artistic." We have looked over these books with a growing interest. We congratulate the authors on the directness and simplicity of most of the problems given and especially upon the problems involving design. We have in mind the leather tooling problems of the seventh grade book, the woodwork and pottery of the fifth, and the paper and cardboard work of the fourth. The color plates showing units of design, color schemes and their application are excellent. Teachers of design in almost any grade of work can get help from these plates. —C. A. B.

Nature's Aid to Design. By Louise W. Bunce and E. S. D. Owen. Published by John Lane Company, New York, 12x8¼ in.; 85 plates and 4 pages of text; price, $5.00.

This book of plates is intended to bring the beautiful flower forms of nature to the aid of the designer. The material for each plate has been selected and arranged by an experienced designer and photographed. For this reason each one is calculated to give just the suggestions the designer needs. The photographs have been well reproduced and the plates arranged alphabetically. They are all held together in a simple pleasing portfolio, and form a valuable addition to the designer's tools. —C. A. B.

The following have been received:

The Mission of Manual Training. By Carl Gustav Rathmann, Assistant Superintendent of Public Schools, St. Louis, Mo. An address before the graduating class of the Manual Training School of Washington University. With an appendix containing the opinions of educators in England, Germany, Austria, and Australia. Published by the Managing Board of the Manual Training School. A twenty-three page pamphlet.

Properties and Uses of the Southern Pines. By H. S. Betts. Circular No. 164 of the Forest Service, U. S. Department of Agriculture, Washington, D. C. An illustrated pamphlet of thirty pages.

The Three R's. By W. H. Elson, Superintendent of Public Schools, Cleveland, Ohio. Published by the Board of Education, Cleveland. A thirty page pamphlet on the widening conception of elementary education, the place assigned to the three R's, and the improvement made in them in recent years.

Instruction in the Fine and Manual Arts in the United States. A statistical monograph by Henry Turner Bailey, editor of The School Arts Book. Bulletin No. 6, 1909, issued by the United States Bureau of Education, Washington, D. C. This 184 page book contains a great mass of data classified for use. It answers many questions that come up from time to time.

Education for Utility and Culture. By Calvin M. Woodward. An address delivered before students of the School of Mines and Metallurgy of the University of Missouri, Rolla, Mo. Published in the June number of the Bulletin issued by this school.

Education for Country Life. By Willet M. Hays, Assistant Secretary of Agriculture. Circular No. 84 of the Office of Experiment Stations of the U. S. Department of Agriculture, Washington, D. C. An illustrated pamphlet of forty pages, giving much space to a discussion of the county system of consolidated rural schools and to agricultural high schools.

Public Trade Schools. By Paul H. Hanus, Professor of Education, Harvard University. Published in the August number of The Bulletin of the Winona Technical Institute. A stenographic report of a commencement address delivered May 29, 1909.

School for Supervisors and Teachers of Industrial Subjects. An illustrated bulletin issued by the Department of Agriculture of the University of Minnesota, University Farm, St. Paul, Minnesota.

High School Manual. Published by the University of Illinois, Urbana, Ill. This shows that the University now allows from 1 to 2 units of admission credit to manual training. It also suggests where manual training should be placed in the high school curriculum and gives the outlines in woodwork, mechanical drawing, freehand drawing, and metalworking presented by a committee at the High School Conference two years ago.

Annual Report of the Superintendent of Public Schools, Cleveland, Ohio. By W. H. Elson. This interesting report is richly illustrated with reproductions of photographs of pieces of work done in the furniture making, sewing, drawing, designing, leather work, metalwork, pottery, knife work, manual training woodwork, and elementary book making. It also shows pupils at work, and the exterior view of the Technical High School.

Practical House Framing. By Albert Fair. Published by the Industrial Book Company, New York, 1909. 5x7½ in.; pp. 108; price, 50 cents. An explanation of the methods of laying out and erecting balloon and braced frames.

Sixteenth Annual Report of the Western Drawing and Manual Training Association. William T. Bawden, editor, Normal, Illinois. Price, 50 cents. This is an excellent report of the proceedings of the meeting held at St. Louis last May. It contains addresses by C. Howard Walker of Boston, Holmes Smith, Frederick O. Sylvester, Edmund H. Wuerpel and Dr. C. M. Woodward of St. Louis, Charles F. Perry of Milwaukee, Ernest A. Batchelder of Pasadena, California, Katherine F. Steiger of Rochester, N. Y., and others; also reports of round tables and of the Committee on Investigation of Art and Manual Training in Normal Schools and the Committee on College Entrance Credits. The book is well printed and is certainly a credit to the Association.

FROM CLEVELAND, OHIO, HIGH SCHOOL.

VOLUME XI NUMBER 3.

MANUAL TRAINING MAGAZINE

FEBRUARY, 1910

THE ETHICAL VALUES OF THE MANUAL AND DOMESTIC ARTS.[1]

WILLIAM NOYES.

THERE are two standards by which to judge of the ethical values of the manual and domestic arts, namely: the individual and the social. Looked at from the individual point of view, the question is: Is the training good for the boy and for the girl? Is the boy a better boy for having spent some of his school time in the shop, and the girl a better girl for becoming acquainted with the household arts? If so, in what respects are they better?

From the social point of view we are interested in knowing whether the introduction of these subjects into the school curriculum is of value to society. What is the social tendency and the ethical meaning of the movement for manual and domestic arts in the school?

In discussions of this subject it is common to consider it chiefly from the individual side and even to limit the ethical value of the manual arts to the acquisition of good habits. If a boy learns to be neat and accurate and careful and honest in the working of wood, the hope is cherished that he will carry over these virtues into his other activities, and this is usually about all that is expected in the way of moral effects. If it can be shown that the effect of the school shop or kitchen is to establish certain good habits then the case is regarded as proven.

This view is open to two objections, one the familiar one that habits acquired in one form of activity do not necessarily pass over into other forms, and second, the more serious one, that habitual actions, however valuable they may be, are by themselves indicative of a low stage of ethical development. To be of high ethical value, actions must proceed from deliberate conscious choice so that no matter how many "good habits" a child may learn in the school work shop, unless he has also acquired the power of distinguishing the better from the worse, and has the inclination to choose the better, he is still only at the threshold of the ethical life.

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[1] A paper presented to the Northern Illinois Teachers' Association, Elgin, November 5, 1909.

Character is not merely a sum of good habits which under a given set of circumstances automatically produce certain reactions, but it also involves a voluntary factor that will select the good in new circumstances. Ethical training then involves the opportunity not merely to acquire certain habits; it also involves the opportunity to deliberate and to choose and finally it tends to induce the choice of the better rather than the worse.

Now the moment we stop to consider what is the better and what is the worse, we are brought face to face with the social aspect of the problem. Individual virtues are virtues because of their social bearings. Ethical values are values inhering in social relationships. Right and wrong—for all practical purposes—are characterizations of conduct with reference to its effect on other human beings. Indeed, in the broad sense, the word "ethical," as distinguished from the non-ethical rather than the unethical, is synonymous with social. Whatever action has social weight has ethical importance.

I make no apology then for considering the ethical value of the manual arts chiefly from the standpoint of their social significance.

The severest indictment, I take it, to be brought against our ordinary schools, is that they are not thoro-going social institutions; if they are not to be called anti-social, they are in many respects unsocial, because they have no vital connection with society as it is. The duties required in them are largely formal rather than real, because they do not flow out of real relationship but out of factitious relationship. The virtues have the sanction, not of the group itself but of an authority imposed from above.

Now so far as the manual arts partake of these characteristics, they too are unsocial and have little or no ethical value. If their courses consist of series of formal exercises, if the things made are of fictitious, not of real value, if the tasks are imposed on the pupil, either against his will or with indifference on his part, if the exercises are merely for discipline in the sense of drill, their ethical value is small or is negative, for the whole process is unsocial. If the child is being taught merely how to do this or that operation the process may be as unethical as learning to multiply or to spell.

But if manual training, so-called, is part and parcel of a social institution, if every project undertaken involves real interests and relationships, if it binds together the pupil and the teacher, binds together the pupil and his mates, binds together the shop and the rest of the school, binds together the school and society; if it involves virile thought and affords an opportunity for individual expression; if it prepares for social life by engagement in typical social life; if it tends not only to develop social habits but to furnish opportunity and incentive for choosing socially valuable conduct; then the movement may be considered to have social weight and ethical value.

The manual training movement in America is now in its fourth stage. The first two of these stages, represented by the Russian system and the Sloyd system, occupied the field together in America from the early eighties to the later nineties. Then came the influence of artistic ideals chiefly thru the arts and crafts movement, the effect of which was to give some esthetic value to the articles made in school shops. A school which has progressed so far as this may still be said to be in the front rank. But a new tide of ideas is now sweeping over, not only the manual training movement, but over the educational world, in the wake of the demand for industrial training.

In discussing the ethical values of the manual training movement then, all four of these stages, the Russian system, the Sloyd system, the arts and crafts movement, and the industrial education movement, should receive consideration.

THE RUSSIAN SYSTEM.

The Russian system was, in a word, an attempt to abstract the processes common to a number of wood and iron-working trades, and teach these processes as processes. It has been characterized by President Hall as "iron in its inflexibility and wooden in its intelligence." Without prejudice, it may be frankly recognized as having in it little to be connected with that view of life which we call ethical.

From the individual standpoint, the best that can be said for it is that it tends to establish certain habits, but it furnishes almost no opportunity for initiative or choice.

Furthermore, ethics, as I have assumed, is a matter of social relationships. Whenever the conditions of life, in the schoolroom, the school shop, the school kitchen, the home, or in the field of industry, are such that they tend to arouse the sense that one is a member of a group and tend to induce the desires and stimulate the activities that will benefit the group, such conditions are ethical. Judged by this standard, the Russian system of manual training is out of court. It is simply non-ethical. It may add desirable accomplishments and habits; the activities involved may be pleasurable; the sense of mastery of materials and power may increase; but all these abilities have no distinct relation to real social situations. The "habit of regarding all capacities and habits of self from the social standpoint"[2] may be utterly unformed. This, it seems to me, is the chief criticism to be leveled at the Russian system, just as it is at the bulk of other school work. Except so far as, in an anticipatory way, it prepares one for social usefulness, it is distinctly non-social and non-ethical.

THE SLOYD SYSTEM.

The Swedish or Sloyd system of manual training, especially as it lay in the minds of its original promoters, had certain definite social aims. Beyond the individualistic virtues of neatness, accuracy, carefulness, respect for labor, squareness (due to the continued use of the try-square!), and so on, it was promoted with certain definite social aims in mind. As a result of the use of modern power and machinery and of the consequent growth of cities, the occupations of the village and rural home in Sweden were dying. The home was disintegrating because its economic bases were removed. The Sloyd movement was an effort to re-establish domestic industry. This was in a narrow sense ethical inasmuch as it endeavored to preserve the group consciousness of the home. To cultivate the capacities and habits that had been useful in the home, to make dominant the attitudes and interests which were vital in the home, all this—so far as it went—was ethical.

Along with this commendable effort, there were associated certain other ideas, that were prominent in Europe, survivals of the class distinctions and interests prevalent there. Peasant children should be kept peasants. In other words the working people should be kept in their place. It was proper enough to teach the children how to make useful articles for the home, dish racks, boot jacks, coat hangers, potato mashers, cooking spoons, etc., but it never would do to allow them to make toys and playthings for themselves. M. A. Sluys, in a report to the minister of education in Belgium, said:

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[2] See Dewey & Tufts: Ethics, p. 298.

> The nature of the objects to be made is determined by the social position of the parents of the pupils; they belong generally to the farming or working class as do the great majority of those in other places who go to the public schools. Such an object (as a toy or ornament) while useful in the home of a rich citizen, would be out of place in the humble lodgings of a workman or peasant . . . . It is in the highest degree important not to cultivate in them (that is, the working people) a taste for frivolities and useless things . . . .Besides, this question has a moral aspect which should engage our attention. Experience proves that children who have been altogether taught construction of objects of luxury afterwards feel a strong dislike for making useful and indispensable ones.

A still more amusing part of the argument is that

> "the same principle should be applied to those in easy cicumstances," because they already had "too much inclination in these modern times to occupy their attention with futile objects." "In having them perform useful work, we may counteract in a certain degree the bad effects of an ill-directed home education."

Morality—in this director's mind—seems to be nearly identified with solemnity.

The evolution of the Sloyd system in the more democratic, more individualistic and more highly industrialized conditions of America, was rapid. The ban on playthings was quickly removed; kitchen utensils gave way to a great variety of objects—corresponding to the shifting of the center of gravity of the home from the kitchen to the sitting room; and the influence of artistic feeling in color and form began to make itself felt.

ARTS AND CRAFTS.

The influence of the arts and crafts movement from this time on has made a distinct impression in the school workshop. Now this movement, as is well known, was in its inception distinctively an ethical movement. Ruskin and Morris were primarily artists, but it was because of their deep moral sense of the injustice and wrong of the present industrial system that they devoted their lives to making art a common possession. Ruskin was an aristocrat, Morris a democrat, but they both saw not only the ugliness but the wrong of an industrial system that turns the green fields into refuse heaps, that fouls the rivers, that packs human beings into warrens, that takes all the joy out of the production of wealth and that makes products both cheap and nasty. Their aim was to restore that social consciousness, that sense of duty which goes with social consciousness which they saw—and to some extent idealized—in the medieval gild. The method they proposed was the reorganization of society on some such basis as the gilds. It is as if they had said:"Men are not capable of a group consciousness that includes all human beings or all of one's fellow workers or fellow countrymen, but only of one's home or trade." This was one shortcoming of the arts and crafts movement. It was ethical but its ethics was narrow. It begrudged to man the use of his own inventions, the use of power and of machinery, because men did not seem to be big enough to use their inventions for the common good. Better, say the arts and crafts promoters, to go back to the human arm and the hammer and chisel and work in little groups bound together by moral ties than to have engines and formulas and great plants and every man care only for himself. That, if you please, is ethics, but not progressive ethics.

The outcome of the arts and crafts movements was to create in the public mind the feeling that a peculiar virtue inhered in hand-made things. They were more honest and reliable, a more warrantable source of joy to the user, because presumably a surer expression of the joy of the maker. The making of things "by hand" seemed to carry with it the guaranty both of beauty and of honor. Sorry to say, to a large number of people this is the extent of the influence of the arts and crafts movement. The democratic fervor which ran hot through the writings of the early promoters of the movement is now cooled in the more purely esthetic pleasure in simple, well made, hand products. The inherent defect of the movement as a remedy for the ills of modern industrialism is that it is applicable to only one portion of industrial activities. It has affected the design of our books, our furniture, our textiles, our pottery, and other household utensils, but really modern products, no longer luxuries but necessities, such as our plumbing and lighting, our buildings in steel and concrete, our huge reduction and manufacturing plants, our systems of communication and transportation, all these are a world untouched by the arts and crafts movement. The man who with an air of distinction wears a watch fob or cravat pin made "craftsy," is, in all probability, dressed from head to foot in clothing every shred or stitch of which may have been made under the worst possible industrial conditions.

The spread of luxury and of taste created a demand in school work for something other than mere utility. The simplicity and charm of the arts and crafts designs made these possible of imitation under the conditions the school offered. The result as a whole is both healthy and helpful. The ethical value is largely of the same sort as that of the sloyd work in its early day. Making pieces of furniture for the home, enhances the interest of the maker in the home group. To make them as beautiful as possible helps give the sense of communion with the best of the world's workers in material things, begets the consciousness of belonging to that group who are making that world a more beautiful place in which to live, the designers, the architects, the craftsmen. All this is of truly ethical value. Furthermore, in so far as this hand work in school can be directed to the making of things of value to other groups than the home, to the school itself, to the common playground, to the club or the church, it secures additional social and ethical weight.

There is besides a sort of negative value in manual work of this sort, that is worth at least a passing notice. Such expressions as "honest toil," "dignity of labor," "living by one's work and not by one's wits," call attention to the difference between the production of wealth and the acquisition of wealth. In a time when to get rich is the chief measure of succcess, there is a real ethical value in pointing out that some must produce wealth before any can get it, that the actual work—by brain and hand—of transforming natural resources into humanly useful material is fundamental and must continue no matter what clever devices, or trade tricks, or shrewd practices, or inequitable system of taxation, may enable one set of men to appropriate what others produce.

Much of our school work adds to the ability—even if not to the inclination—of pupils to live off their fellows rather than live with them. History, which is largely the story of the exploitation of weak nations by strong ones, is often taught as worthy of unqualified praise and imitation, as if the chief function of ancestors was to set an example to posterity. Military heroes take prominence over industrial heroes and industrial exploiters over industrial inventors, and rich men are held up as examples no matter how they got their riches.

Within a month I heard the boys in a large public school told that the famines in India were due to the laziness and dirtiness of the Hindoos, but not a word was said of England's exploitation of India. Arithmetic, as commonly taught, directs attention not so much to the ways in which men produce wealth as to the ways they get it away from each other, that is, it is commercial arithmetic rather than shop mathematics, a survival of its introduction into schools in the wake of commercial progress. I can conceive that geography might be taught in a way that would show some of the existing wrongs of wealth distribution as well as the mere physical facts of the production and distribution of wealth, for example, by showing how the pressure of population in cities causes the unearned increment of land.

Whatever be true of other subjects in school, the manual arts, industrial and domestic, are, even without comment, constantly calling attention to the fact that wealth is *created* by effort, that the creation of wealth is fundamental to human society, and that no matter how or to what extent that wealth be afterward abused and perverted, robbed and re-robbed, the production of wealth is essentially a social act. It does not follow that it is necessarily an ethical act. That depends on the consciousness and intention of the worker, but at least it is the medium in which conduct is likely to be ethical. Indeed we may go further and affirm that to an exceptional degree productive labor furnishes the opportunity for ethical conduct. Common social endeavor—work—furnishes good soil in which character may grow.

We may grant that much of our manual training is formal, individualistic and unproductive, but even as now taught it furnishes many favorable conditions for the growth of character. The relations of boy to boy, and of boy to teacher are informal, there are many opportunities for co-operation and natural helpfulness, there is an approach to the participation in industrial activities, and there is or may be the mellowing and refining influence of art applied to the things made.

Valuable as all this is we can hardly be content therewith. There is also the atmosphere of formality, of unreality in manual training, that pervades most school work. The child has been sucked out of the great stream of human desires and human endeavor and human achievements and shut up in compartments where the great human motives are out of place. The school is not life, but a dead copy and abstraction of certain processes that are found in life, and we naively expect that rigid attention to these fruitless processes, with an occasional dash of dramatic simulation of real life, will produce good men and women.

No system of manual training, Sloyd, Russian, or arts and crafts, tacked on to an ethically barren school system can be pregnant with great volumes of virtue. Real men and women with real virtues are the product of real life, and real boys and girls with real desires will have real virtue, not by being pumped thru the pipes of a formal school system, but by genuine participation in a real life, capable of their comprehension and stimulative of their stongest motives.

INDUSTRIAL EDUCATION.

It remains still to speak of the fourth stage of the manual training movement, upon which we are just entering, the industrial education movement. For some time there has been the voice of one (and some followers of his) crying in the wilderness and telling the value of the study of industries and of adapting and participating in them for the sake of obtaining a growing social consciousness, and in a small way there have been efforts to make this possible, but the means have been largely confined to primitive because simple and comprehensible industries.

The educational movement, as it now stands, is due to a tardy recognition of the fact that the home is no longer the center of industry, and that consequently the training of the child in industrial and social activities and habits can no longer be left to the home, but must be undertaken by some larger group.

This movement is also due to the recognition of the impracticability of the endeavor to solve modern problems by reverting to medieval institutions and methods. The arts and crafts movement has performed and is performing a great mission in calling attention to the ugliness, barrenness and injustice of modern industrial life, and in bringing back to view, if not to life, a form of industrial organization and methods of work which were soundly ethical and enriched and beautified life.

But the new wine of scientific and mechanical production cannot be put into the old bottles of the home and the gild. As a means of conspicuous consumption by some of the leisure class, as a means of recreation by some with a gift for construction, as an object lesson in the beauty of simplicity, the arts and crafts movement may—we may venture to prophesy will—long survive.

But modern machinery and mechanics and electricity—in a word, applied science—is not likely to abdicate its power in favor of primitive and medieval methods and products. We are in a new age, industrially, in which neither the methods nor the motives of the home and the handicraft shop will suffice. It is—I take it—a recognition of these facts that underlies what is known as the movement for industrial education. So long as the home was the center and seat of industry, the child was educated there, educated and trained, not only in the technic of his probable occupation, but in its ethics. He acquired the habits, the sense of responsibility, the loyalty to his associates, that made him not only a good workman, but a good man. So under the gild system the youth was given not only an environment but a training in ethical values, that is, in group consciousness, and the conscience that goes with it.

But we are now waking up to the fact that our own inventions have created an environment to which we are not yet fitted. We have established the conditions of cosmopolitanism, without attaining the cosmopolitan mind. Nothing could be more contradictory than race prejudice in an environment of common means of transportation, communication and amusement. Yet daily we live in this contradiction. We have devised industrial machinery that puts our medieval consciences to the breaking strain. Our ethical equipment does not match our material resources. For example, we think we can measure the moral character of a great organizer of men in terms of charity and philanthropy. In an age when social interdependence and democracy are inwrought in the very nature of production and exchange, there survive ethical ideals that belong to an age of special privilege and class distinctions. More especially in our own country for a long time abundant natural resources made possible an approximately equitable distribution of wealth for all who had a fair degree of thrift and industriousness. The wants of unfortunates were supplied by kindliness and good will. But now when resources are monopolized and power concentrated, these homely virtues do not answer. When workmen worked side by side with their masters, under conditions where a large proportion of them might hope in time to become masters, thoroness, sobriety, honesty, assiduity, devotion to the good of the master and the gild, constituted a good workman. But these virtues are not adequate for a workman in an industrial democracy. Loyalty to the gild must enlarge into loyalty not only to the union, but to the whole body of working men, and ultimately to the common good of all. It would take us too far afield to trace out more illustrations in which ethically we are not living up to our opportunities.

SIGNIFICANCE OF THE HOUSEHOLD ARTS.

The household arts seem to have a peculiarly felicitous opportunity to bridge over this gap between the ethics of a wholly household economy and the needed ethics of the present industrial and coming social economy. The home still exists, a useful and necessary institution, robbed of many of its functions, to be sure, but still perpetuating many. Its relations to other institutions are more complex and intimate than ever, but its hold on the sentiments and affections is more consciously deep and firm than ever. At the same time that the application of science, physical, chemical and biological, to home activities is becoming feasible, the dependence of the home on large social activities is becoming deeper. At the same time that the housewife must know more about chemistry in order to do "her own work," the welfare of the household depends more than ever on the condition of "municipal housekeeping," on the purity of foods and the soundness of materials. She cannot escape her larger responsibilities if she would. The time has come when a good mother must also be a good citizen. Not only must she know how to feed her own household; she must also be one of many to see that all households have pure foods. Nowadays private sanitation is but a part of public sanitation. The only way by which the woman of to-day can be sure of getting "all wool" and "all linen" for herself is by joining others to make it possible for all to get them. The only way by which she can be rid of those death dealing plagues of humanity, the typhoid fly and the malaria mosquito is by the concerted effort of whole communities, and not by buying window screens and fly paper.

So it comes about that the teacher of the household arts, who can look at her subject both intensely and broadly and see it in its relation to the home, to the school and to society, can, in an especial way bind the breach between the old and the new, can help develop the ethics of the larger social life of to-day as well as conserve the inestimable virtues of the domestic life of yesterday.

Our ethics, to go back to the argument, lags behind our material achievement, and it is therefore, from the point of view of ethics, no simple task upon which the school is entering, this of vocational education, for upon the school is largely laid the responsibility, not only of making good workmen but of making workmen good. To some this problem of industrial education may seem a comparatively easy matter, to those, for example, who see only that there are needed for the operation of our machines, skilled workers and speedy workers. To them it is simply a question of the city or state giving its sanction and help to the training of deft and swift mechanics. What certain great industries want to-day is abundance of submissive, automatic, skillful tenders of machines, and they are asking the public school to supply the demand.

Although modern industry is the greatest of all social and socializing agencies, yet under its present form, the full and free development of the workers is of no consequence to the employers. So far as the employer is concerned, the ideal training for the worker is that he learn to do efficiently one particular task. The employer cares only to turn out a better, or at any rate a greater product. He wants that sort of industrial education which will make accurate and speedy machine tenders.

THE LARGER MEANING OF INDUSTRIAL EDUCATION.

Others with broader vision see that the larger life of the modern man demands greater opportunities in school than books alone can give. They see the importance of all-around intelligence and efficiency in industrial life. They see the necessity and wisdom of the state using modern processes and modern tools as a means of discipline and culture.

But there is a still larger view of the problem of industrial education. We do need and we do want more skilled and speedy workmen; we do need and do want to have industry utilized as a means of culture; but more than all we need a growing sense of the common life and the common good. We need not only to catch up ethically with our present industrial stage; we should be gaining the ethical fiber for the next stage. Every year the common life becomes more real; every year the common good becomes less of a utopian dream and more of an actuality. Now the sense of it can only be gained by participation in it. It is well to be informed about industrial processes, to know how they have been evolved, to understand (at least to some extent) the scientific principles involved in the modern production of wealth. All these are genuine means of culture, not included in a famous five-foot shelf of books, and they constitute a good not to be underrated; but in addition, to appreciate the human relationships that inhere in modern wealth production, to have the social sense of belonging to a group that is as wide as the world itself, to meet the responsibilities of membership in this group, to live up to the large freedom that belongs to a member of the world, these constitute the ethical problem which the school, among other social institutions is called upon to answer.

The school, unsocial institution tho it be in many respects, does aim and chiefly aim to give each child his fullest development, to make him a socially valuable, ethical person. But it is handicapped, blind and handicapped, in that it has no vital connection with industry. The educator wants to produce men socially worthy, men conscious of the common life, the common duty, the common good, in a word better men.

This then is the modern educational problem. The employer of men wants efficient mechanics, the educator wants to include the field of industry as a means of culture and moral discipline. The problem is how to unite these differing and to some extent contradictory desires.

The union may come, I venture to hope will come, when the school provides its pupils with the full opportunity to participate in real modern industries, under such conditions that there shall be no exploitation but growth—physical, mental, and moral growth.

My contention is that there can be no adequate sense of duty, of responsibility, of freedom, without participation in real activities. The most real, the most fundamental, the most extensive and therefore the most important of human activities are found in work, in the production of wealth for the common good. There is no other soil so fit for the growth of real virtue as this field of work, of endeavor by brain and hand to supply the world's needs. It may be perverted as we well know, into a means of aggrandizement and exploitation, and this is the case just so far as the common wealth, the wealth commonly produced, is devoted, not to the common welfare, but to private advantage. But to partake in the production of wealth for the common good, and at the same time to know that it is for the common good, these are the indispensible conditions for the ethical life.

Now manual training has been a feeble attempt to give children some part in this great world process, a part of which they have been robbed by the expansion and concentration of modern industry. The greatest wrong that modern life inflicts on children is not the loss of play, not the loss of home advantages, not the loss of out-of-door and country associations, serious and dreadful as all these are; their greatest wrong is the deprivation of the right to work, of the right to participate in the great productive processes of life.

The only way in which modern industrialism has provided work for children is under conditions so horrible, that the very word "child labor" has become a shame and disgrace. Yet it is by work, chiefly by work, by participation in productive industry that we can hope to train children into that character which has social value and ethical worth.[8] Already there are signs that the manual and domestic arts are developing in the direction of furnishing opportunities for character growth by participation in productive industry.

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[8] See Noyes: Overwork, Idleness or Industrial Education? Annals of the American Academy of Political and Social Science, March, 1906.

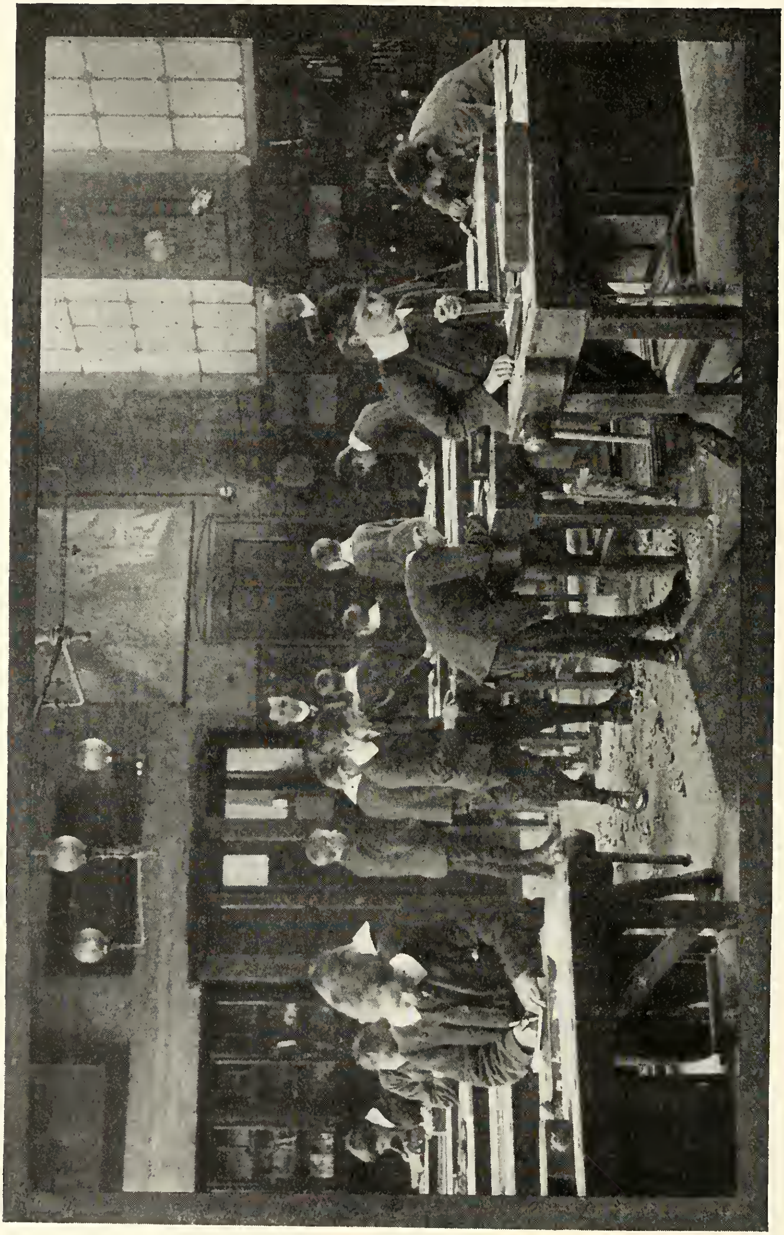


FIG. 32. A MANUAL TRAINING CENTER IN LEICESTER.

VISITING MANUAL TRAINING SCHOOLS IN EUROPE.

III.—LEICESTER AND SHEFFIELD.

CHARLES A. BENNETT.

BEFORE leaving London I was told that I must be sure to visit Leicester, for there I would find one of the most progressive systems of manual training in England. I am grateful to the man who gave me this information, for the day I spent in Leicester was one of the most profitable in all my journey thru the Midland District. This was not because the scheme of work in Leicester was more like our American manual training than I found elsewhere in England, but because in Leicester the industrial motive has almost wholly given way to the pedagogic, thus presenting a strong contrast with the work in some other cities, and especially because some of the methods employed in Leicester are so reactionary as to stimulate investigation and discriminating thought.

I reached Leicester in the evening, coming from Birmingham. The next morning at nine o'clock I was at the Education Office in the Town Hall, where I met Charles Bird, the supervisor of manual training. Mr. Bird told me that I was fortunate in the day I had selected for the visit, because the Board of Education inspector, Mr. Carrodus, was in town and would be at one of the manual training centers during a part of the morning. Without much delay we proceeded to that center. It was in the poorer district of the city, in a building formerly used for another purpose by the Society of Friends. The place was roomy and convenient, Fig. 32, with high ceiling and large high windows giving excellent light. On the walls of the room were charts, tool-racks, specimens of wood and models. At one end of the shop a door opened into an exhibit and store room. The shop was equipped with ten double benches, under the top of each of which was a closet, but these closets, unlike those in Birmingham, were not divided into pigeon holes. All the boys working at a given bench—ten or more in as many classes, used the closet in common. The supervisor preferred this method because it gave, as he claimed, an opportunity for training in respect for the other fellow's property which the individual pigeon-hole plan did not. Mr. Bird is not concerned so much with equipments as most of the other supervisors I met. While he likes a good one he gives emphasis to the fact that he considers the equipment of very minor importance compared with the kind of instruction given. Likewise he is not so much concerned with what is taught as how it is taught. However, his course of models is carefully planned. As is shown by Fig. 33, the course is a modification of the Swedish sloyd.

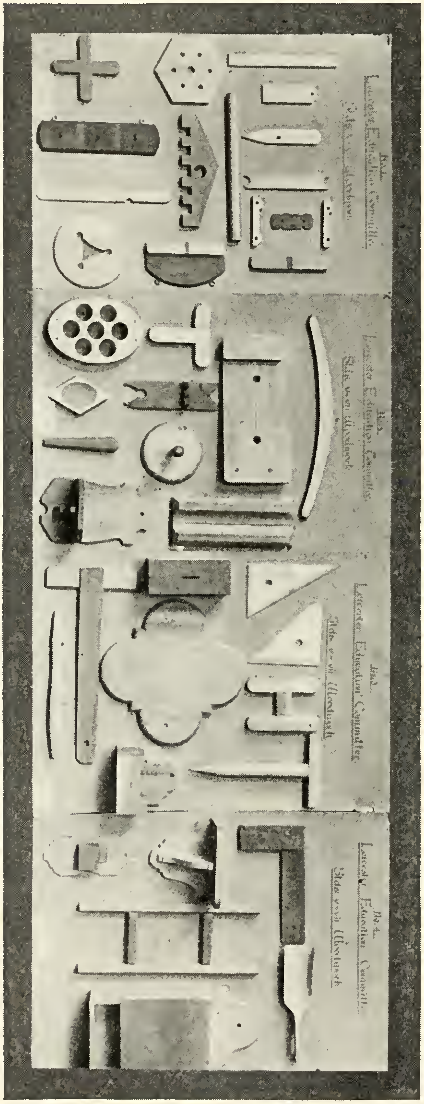


FIG. 33. COURSE IN WOODWORKING FOR SIXTH AND SEVENTH STANDARDS, LEICESTER.

METHODS OF TEACHING IN LEICESTER.

Mr. Bird studied at Nääs and at Leipsic, and uses a fixed series of models based upon the weaker child's ability instead of upon the ability of the "average child." Each child makes all the models in the order arranged by the supervisor unless the teacher is convinced that the pupil may profitably skip certain ones. Individual instruction is given to the exclusion of class instruction, except that a part of the class—say five or six out of the twenty—may be called together to discuss a point that has come up in the progress of the work. No demonstration lessons are given, and what seems more remarkable, no pupil is ever told how to do anything and seldom, if ever, shown how. The aim is avoid imitative methods and to develop rational thought from the very beginning of the work. Mr.

Bird takes it for granted that all good technical methods may be reasoned out and therefore each child should think out his own method for himself—rediscover good technic, the function of the teacher being not to tell or to show how to do, but to stimulate the child's thinking in the right direction. This he seeks to accomplish by means of questions. Mr. Bird cares nothing for the technical results, but everything for the thought power developed. He believes that the ultimate and inevitable result of developing such power will be skill of hand which will produce good technical results.

In presenting Mr. Bird's theory I certainly can not do better than to quote at some length from his own words in an article on "The Teaching of Educational Handwork," which was published in the June, 1909, number of *Educational Handwork*. He says:

> It will hardly be denied that the normal child possesses in a marked degree such characteristics as curiosity, inquisitiveness, a love of prying into things, of questioning and doubting, which are frequently amusing and sometimes embarrassing. Of his originality, adaptability, resourcefulness, and independence there can be no possible doubt. It is these characteristics, so pre-eminent in their importance as assets in after life, which a reasonable system of educational handwork can stimulate and strengthen. It is greatly to be feared these characteristics have not been strengthened but rather weakened by the educational method of the past.
>
> For this purpose the children must be allowed to depend upon their own thought and judgment in doing things. If the work given be interesting in character, and not too difficult for mind and hand to fashion, surely the children may be allowed to exercise their whole powers upon it without let or hindrance; where unreasonableness is shown, failure to adapt means to ends and the like, the cause is discoverable, and it is the business of the teacher to see that the children discover it. Let the children see, think, and do; later may possibly be time for explanations, surely not before. . . .
>
> As an example of the manner of dealing with the handwork, let us take the first model of any course. This model is made by the teacher previous to the lesson, so that the children do not see how the work has been done. The model is shown to the children, and they are asked to tell all they can about it. Whatever information is given comes from the *children's own initiative,* not from the promptings of the teacher. It is evident that the more senses which are employed in conveying the impressions to the mind, and the nearer the senses are to the object, the deeper and more truthful will those impressions be. It is therefore reasonable that every sense be brought to bear that can be of service. The children are required to give expression to those impressions in clear and exact language. This part of the work is never omitted, but it is often deferred to the end of the lesson. Similar observational and critical lessons are taken on every tool, material, etc., employed in the work. It is very important that these expressions

of sense impression be encouraged by every possible means, and that, of course, in as many different ways as possible—by drawing, in material, by writing, painting, etc., but especially by *word,* the common method of intercourse between human beings. How loose and inexact the language of ordinary school children is!

It can generally be arranged that each child has a model, tool, piece of material, etc., in his hand when giving oral expression to his sense impressions. The children must be required to dig deeper and deeper into the matter as time goes by, till nothing is concealed that can be revealed. This ample and extensive, not to say profound, revelation of the object must come entirely from the children—they must *not* be told. It appears to me to be a sound principle to act upon, that children should know *"everything about something."* Has the shallowness of the age, of which one hears so much, anything to do with beginning too soon to learn *"something about everything?"* Anyway, as the child is to be his own engineer in this matter, he must know all his senses can tell him of the thing, or the hiatus will cause illogical thinking and poor execution.

The model is thus reviewed and criticised from every aspect that the ingenuity of the children can devise. They are now required to draw it or get the material and make it as the case may be. The teacher watches the proceedings with "masterly inactivity," as a Government inspector named one of my teacher's attitude the other day. When sufficient, reasonable and unreasonable, methods of attacking whatever problem awaits solution have been observed, the teacher calls a halt. The methods, tools used, etc., are all brought to the notice of the scholars and freely and critically discussed by them.

I think it very important that the teacher should not bias the children in their judgments; each and all must, and will, take a part in questioning, in Socratic vein, the various methods brought to their notice; other methods also, must be obtained from the children. There is a discoverable reason why one method is better than another, if it be better; one tool more adapted to the purpose in hand than another, etc. If we wish the children to develop a reasonable judgment in all things, as we surely do, we must on no account discover for them what they can discover for themselves. And what can they not discover?

The teaching proceeds on these lines thruout. It will be understood that the unreasonableness tends to apply to the individual rather than the class as the work proceeds, hence the criticism tends to become individual. My experience is, that children treated in this way, left to their own resources for their seeing, thinking, and doing, and then examined critically in every detail of their action, become more and more reasonable as the time goes by. Uniformity of method—in other words, the teacher's method—is not even desirable. What is wanted is that each child find its own method. If the children reveal themselves, the teacher can act from sure knowledge of strengths and weaknesses, of needs and necessities. Otherwise, if the teacher supplies the method, the children are robbed of their natural inquisitiveness and curiosity, and may become mere storehouses of dead information. A little patience and a cheerful manner are all that are required to bring out the innate courage and capacity of the children, and cause them to attack their work with an intelligence, a vim, and a vigor delightful to observe.

> We all depend for self-preservation upon our own judgment. It cannot be a reasonable thing that in the thousand and one daily actions and activities of the school, the child should be compelled so often to act by the judgment of others. "You must do things this way," and "You must not do things that way," are far too frequently heard. I think a better answer to the question "How should I do this?" is "Do it as you please."

Enough has been said about Mr. Bird's method to make clear the fact that his is a decided reaction against the imitative method of the demonstration lesson, which he considers bad, and against such weak ineffective individual instruction as is given when the teacher merely tells the pupil what to do, giving him no explanation or reason, and stimulating no adequate thought. As a reaction against bad teaching, Mr. Bird's method is timely and deserves the attention of teachers in America as well as England, but like some other reactions it seems to go too far. In abolishing imitation as a means in the hands of a wise teacher it takes away one of his most effective and economical instruments, for by nature man is "the imitative animal *par excellence*." I am reminded of the paragraph in Professor James' "Talks to Teachers," in which he speaks of imitation and invention as the two legs on which the human race has walked—not one without the other but both working together. So I believe with the skilful teacher:—he uses both—first one and then the other as the needs arise.

AN INSPECTOR AT WORK.

Before the morning was half gone and while I was absorbing the new ideas in Mr. Bird's method of teaching, Mr. Carrodus came to the shop to inspect it. In my travels I had heard so much about inspectors that I was prepared for almost anything except what came into the room that morning. After a few minutes of conversation with Mr. Bird and myself, he began his work. He went about among the boys, not in a lordly manner, giving superficial glances at the work, but in the simplest possible way, looking into every detail of what was going on in the room. If he saw any boy doing his work the wrong way he would stop and ask him questions that would lead him to see the error of his way. If a boy had made mistakes that could not be remedied, Mr. Carrodus took plenty of time to discuss the whole trouble with the boy in such a way as would be most helpful to him in the future. After this quiet work had been going on for a half-hour or more with the boys, the inspector's real purpose became evident. He asked the pupils to cease work and stand at their benches. He then conducted a lesson covering several of the defects he had discovered. For the boys this lesson was one to be remembered, and for the teacher it was one of the keenest, yet most suggestive criticisms to which I have ever listened. He seemed to be talking to the boys but in reality he was striking at the fundamental weaknesses in that teacher's work. He did not give a learned dissertation on pedagogy, but there was sound pedagogy behind his clear-cut, practical discussion of how to plane, how to lay out work successfully, etc., etc. Any teacher might get help from such a lesson. But in all this lesson I found nothing out of harmony with Supervisor Bird's theories. The one thing in which he differed with Mr. Bird he discussed more privately with him at one side of the room.

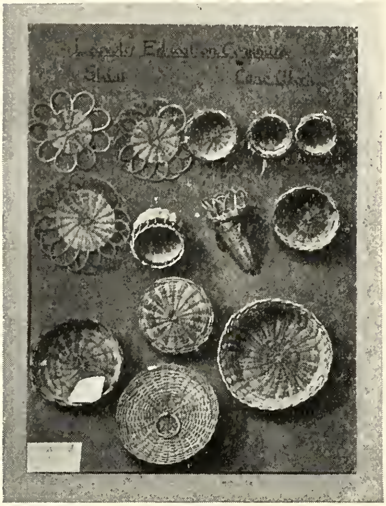


FIG. 34. BASKETRY, SECOND STANDARD, LEICESTER.

Perhaps Mr. Carrodus is not a typical English inspector. Perhaps I saw him at his best and in a school that was it its best, but I could not help but feel that such inspection was really helpful to everyone concerned—pupils, teacher, and supervisor. And then I thought what good might come to the manual training work of the State of Illinois, or of any other state in the American Union for that matter, if there were such an inspector to go from town to town, advising with the supervisors, and stimulating the teachers to better methods and higher ideals in their work. Inspection that really inspects is greatly needed in the United States. It should take the place of or supplement the "nominal supervision" of superintendents of schools and high school principals who usually leave the manual training teacher "to his own devices" or boldly "rush in where angels fear to tread."

The course of instruction in Leicester covers all seven of the standards. In the first standard clay or other plastic material is used. In the second cane basketry is taught, Fig. 34; in the third, paper and cardboard work, Fig. 35; and in the fourth and in some schools in the fifth, knifework in thin wood, Fig. 36. In the sixth and seventh standard and sometimes in the fifth the boys are taught the benchwork in wood, Fig. 33. The girls of the first four standards are given the same work as the boys. Above the fourth standard they take domestic subjects.

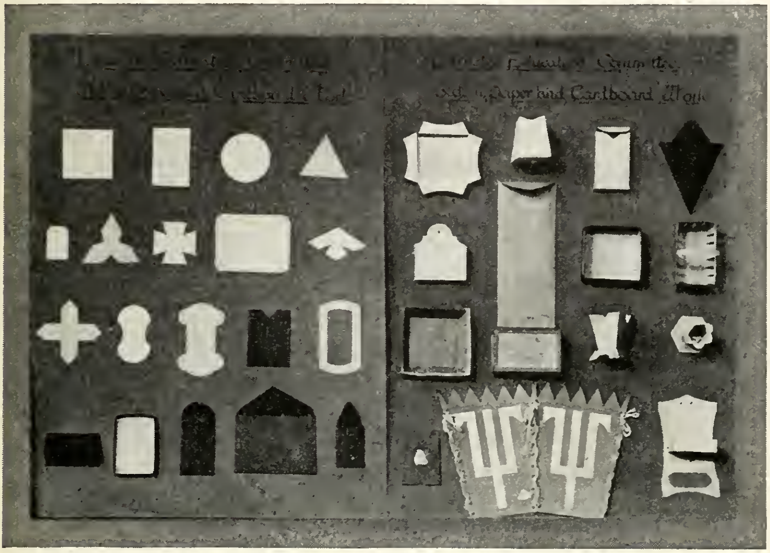


FIG. 35. PAPER AND CARDBOARD WORK, THIRD STANDARD, LEICESTER.

The time given to the work is one hour a week in the first four standards and about two-and-a-half hours in the three upper standards. Only one kind of material is employed each year. If more time were allowed in the lower standards Mr. Bird believes more than one kind of material could be used advantageously each year. Fig. 37 shows a kind of woodwork which has been tried with success in one of the lower standards. After the course of sloyd models the pupils of the evening schools go on into the construction of small pieces of furniture such as the stool, small cabinet, and inlaid tables shown in Fig. 38.

Before leaving Leicester I spent a short time visiting the Municipal Training College for Domestic Subjects and the Municipal Technical and Art School. The former trains teachers in "cookery, laundry work, and housewifery," gives instruction in these subjects to pupils of the elementary and secondary schools thru practice classes for students in training, admits a few students who are not preparing to be teachers if there are vacancies in the regular classes, and executes a limited number of orders for special dishes in cookery and for laundry work. I was in this school only a few minutes, but the impression I gained was most

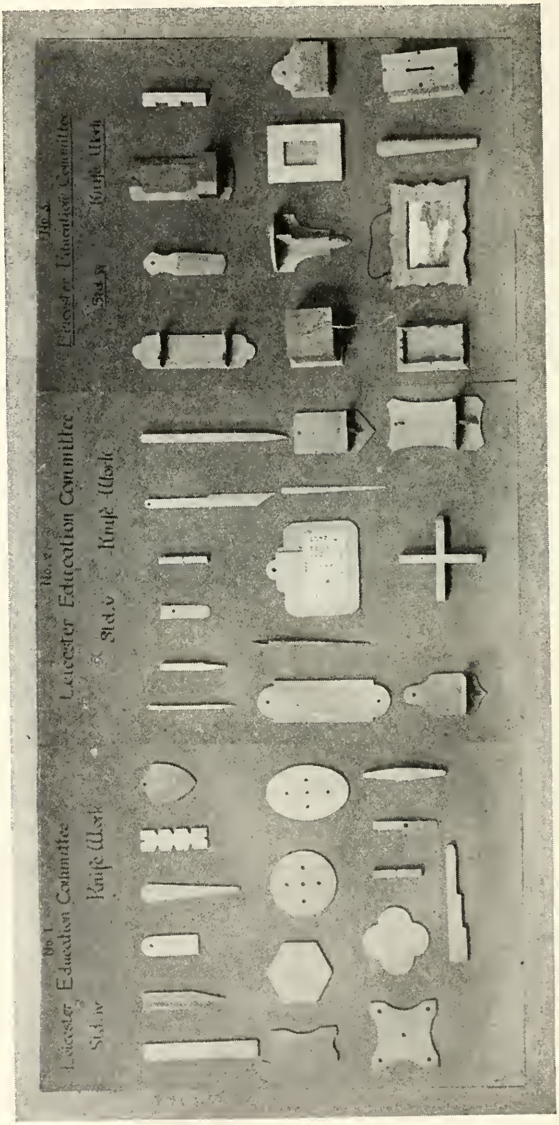

No. 1
Leicester Education Committee
Knife Work
Std. IV
No. 2
Leicester Education Committee
Knife Work
Std. V
No. 3
Leicester Education Committee
Knife Work
Std. V

FIG. 36. KNIFEWORK, FOURTH AND FIFTH STANDARDS, LEICESTER.

favorable. Thoroness and high ideals seemed to prevail. I spent more time at the Municipal Technical and Art School. Here as elsewhere

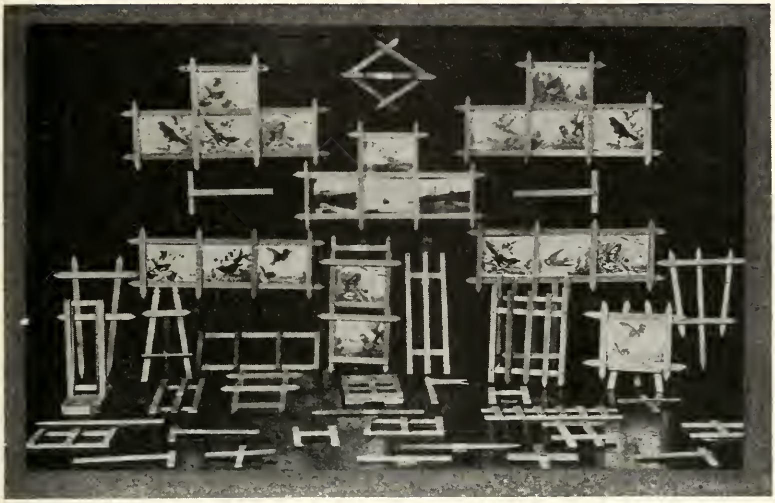


FIG. 37. WOODWORK FOR PRIMARY GRADES, LEICESTER.

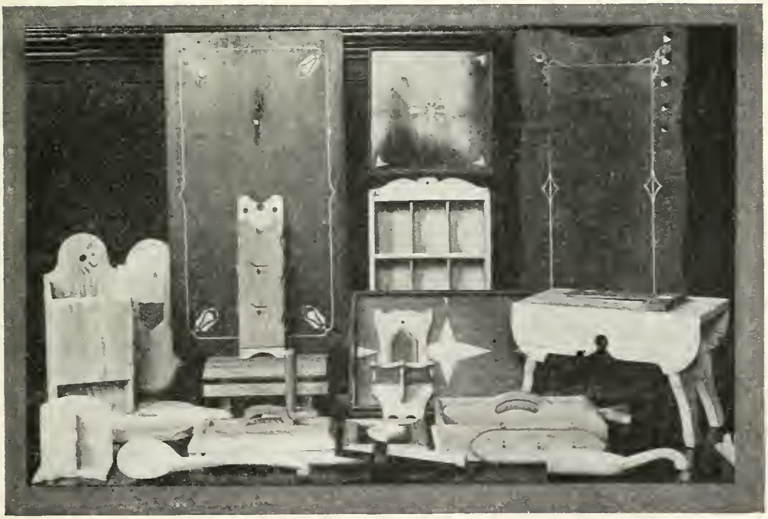


FIG. 38. WORK OF EVENING CLASS, LEICESTER.

in England in similar schools I found a fine building and a staff of instructors made up of experts in the technical processes of special importance in the industries of the town. Leicester is one of the chief centers of boot and shoe and hosiery manufacture. Consequently in the Municipal Technical School we find a department of the "technology of the boot and shoe trade," a department of the "technology of framework knitting," and a dyeing department. These departments occupy a large amount of floor space and are equipped with the most modern machinery. In the Art School, as in Birmingham, art finds expression in bookbinding, jewelry and metalwork, wood-carving, sculpture, typography and lettering, and stained glass. An important place is given to the study of architecture.

MANUAL TRAINING IN SHEFFIELD.

When I alighted from the train in Sheffield I was cordially greeted by C. W. D. Boxall, the supervisor of manual training, who conducted me to my hotel. The next morning he called for me at nine o'clock and we went at once to the latest manual training center in the city—at the Salmon Pastures School in the smoky, factory section of the city. The school was of the most modern type, built of stone, and provided with a system of heating and ventilating which also included filtering all the air that went into the school rooms. This was accomplished by drawing the air thru two large drums which were covered with heavy sacking and kept revolving in a tray of water which was constantly replenished by small streams against the front, or outside ends of the drums. On the first floor of a wing of this building was the manual training center. It was provided with a separate entrance, a wash room and a lumber room. The shop had windows on three sides—large ones on two opposite sides and smaller ones at the end over the case which occupied the entire length of the room, Fig. 39. The shop was equipped with double benches in the middle of each of which was a double rack for holding drawings and notes. The vise was made with a plain, iron, square-thread screw and but one guide—a steel rod in a metal sleeve. Mr. Boxall does not believe in giving boys in the grammar grades a quick-action vise. He thinks the less expensive and simpler ones are just as good from every point of view. As is shown in the illustration, the tools are kept on a rack on the end of the bench. The room had been equipped so recently that some of the tools were not yet in place and the system of the shop not in full running order.

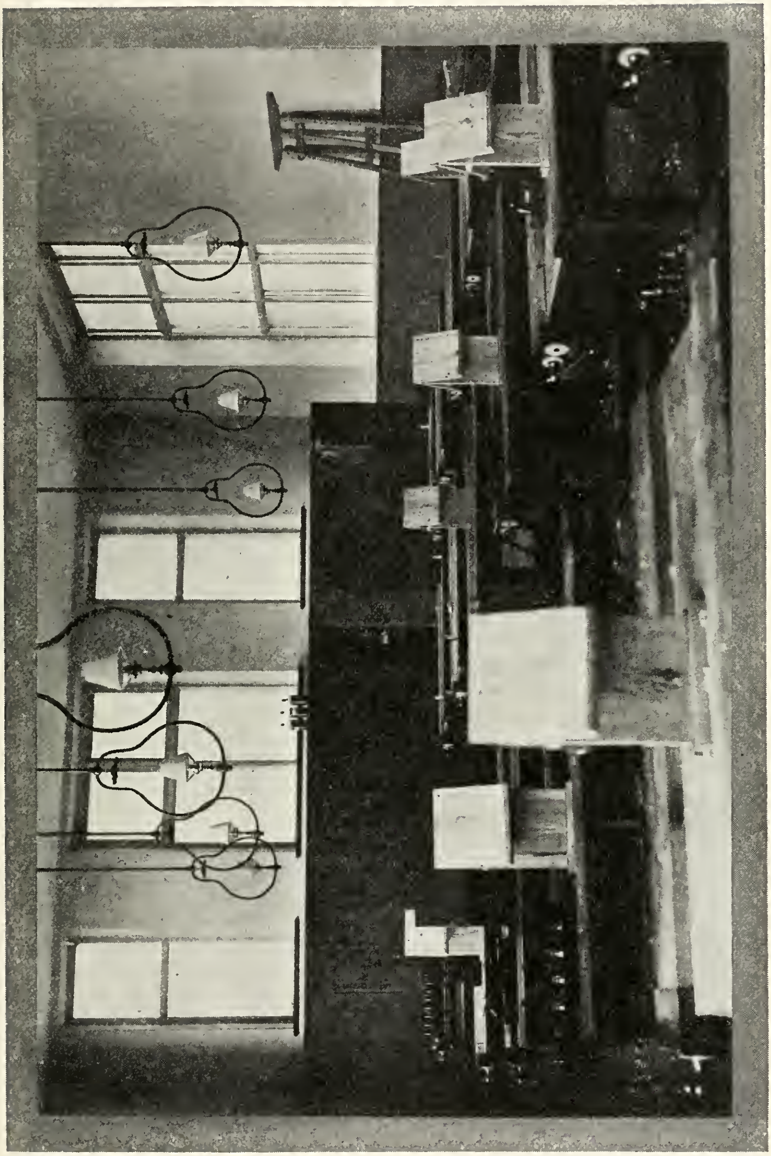


FIG. 39. SALMON PASTURES MANUAL TRAINING CENTER, SHEFFIELD.

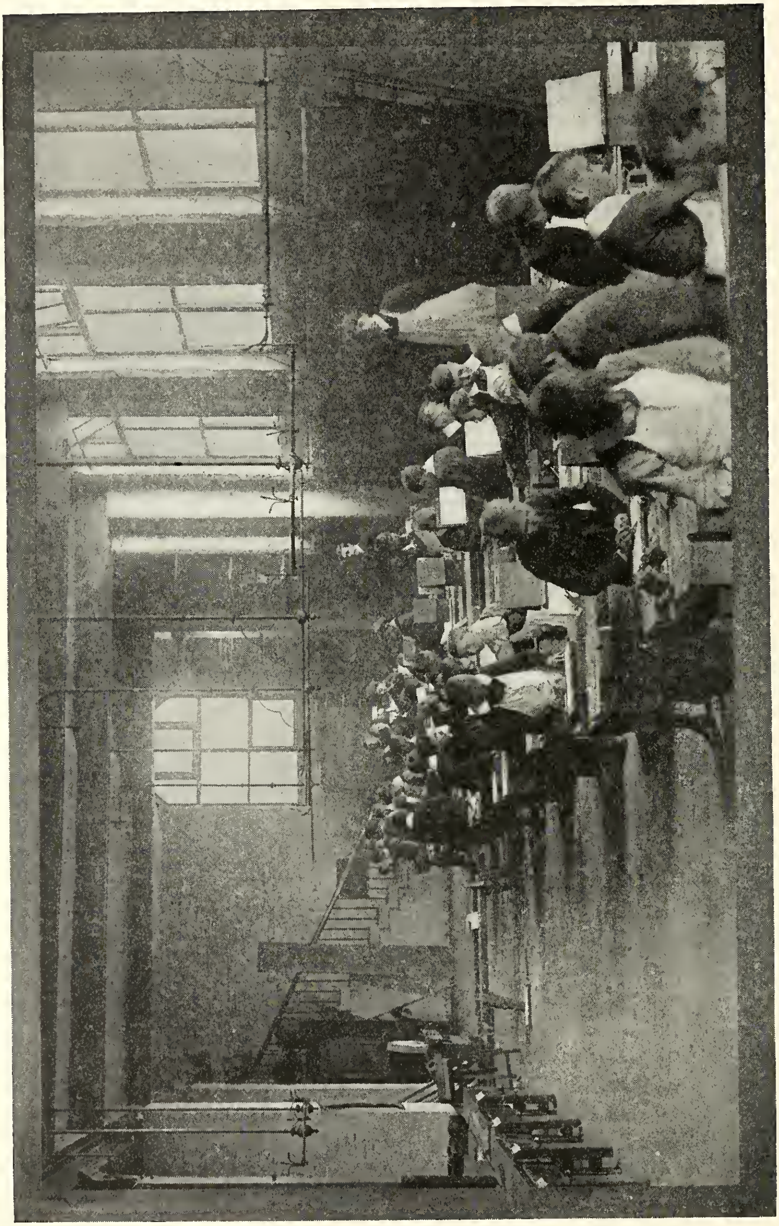


FIG. 40. DUCHESS ROAD MANUAL TRAINING CENTER, SHEFFIELD.

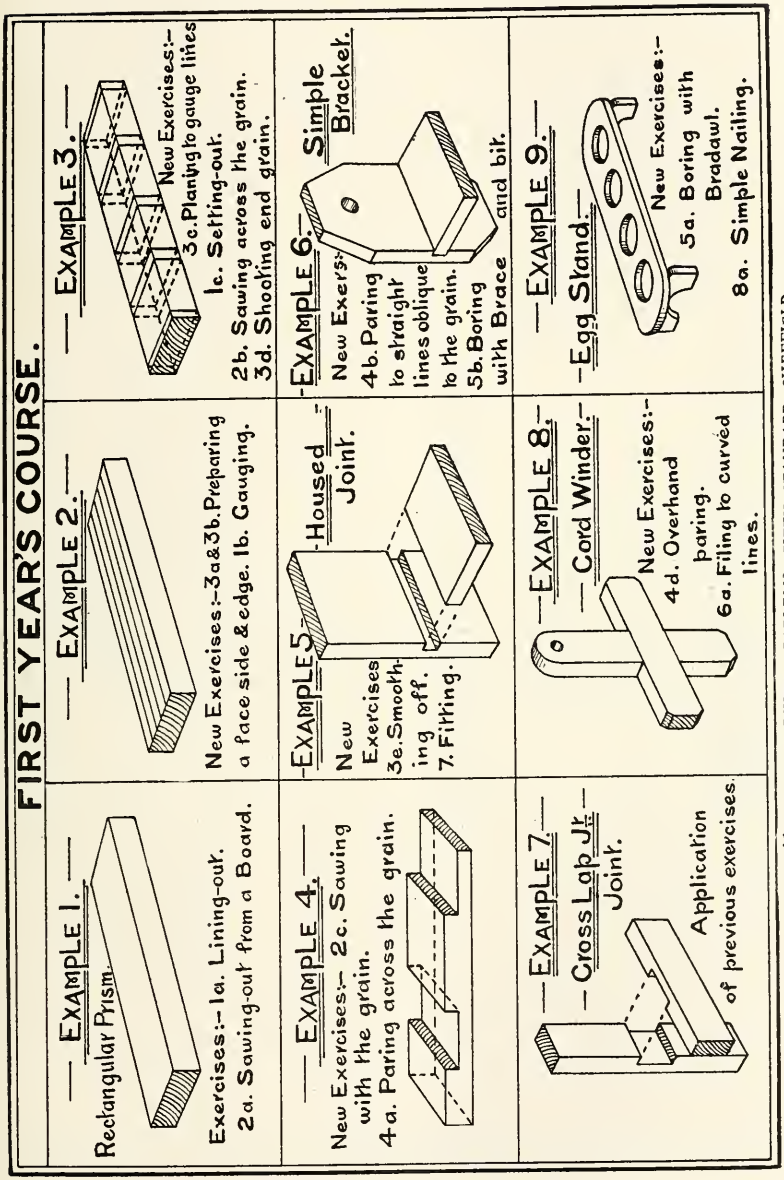

FIRST YEAR'S COURSE.
— EXAMPLE 1. —
Rectangular Prism.
Exercises:—1a. Lining-out.
2a. Sawing-out from a Board.
— EXAMPLE 2. —
New Exercises:—3a & 3b. Preparing a face side & edge. 1b. Gauging.
— EXAMPLE 3. —
New Exercises:—
3c. Planing to gauge lines
1c. Setting-out.
2b. Sawing across the grain.
3d. Shooting end grain.
— EXAMPLE 4. —
New Exercises:— 2c. Sawing with the grain.
4a. Paring across the grain.
-EXAMPLE 5- -Housed Joint.-
New Exercises
3e. Smoothing off.
7. Fitting.
-EXAMPLE 6.- Simple Bracket.
New Exers:
4b. Paring to straight lines oblique to the grain.
5b. Boring with Brace and bit.
— EXAMPLE 7. —
— Cross Lap Jt. — Joint.
Application of previous exercises.
—EXAMPLE 8.—
— Cord Winder.—
New Exercises:—
4d. Overhand paring.
6a. Filing to curved lines.
— EXAMPLE 9. —
— Egg Stand. —
New Exercises:—
5a. Boring with Bradawl.
8a. Simple Nailing.

FIG. 41. WOODWORKING PROBLEMS, FIFTH STANDARD, SHEFFIELD.

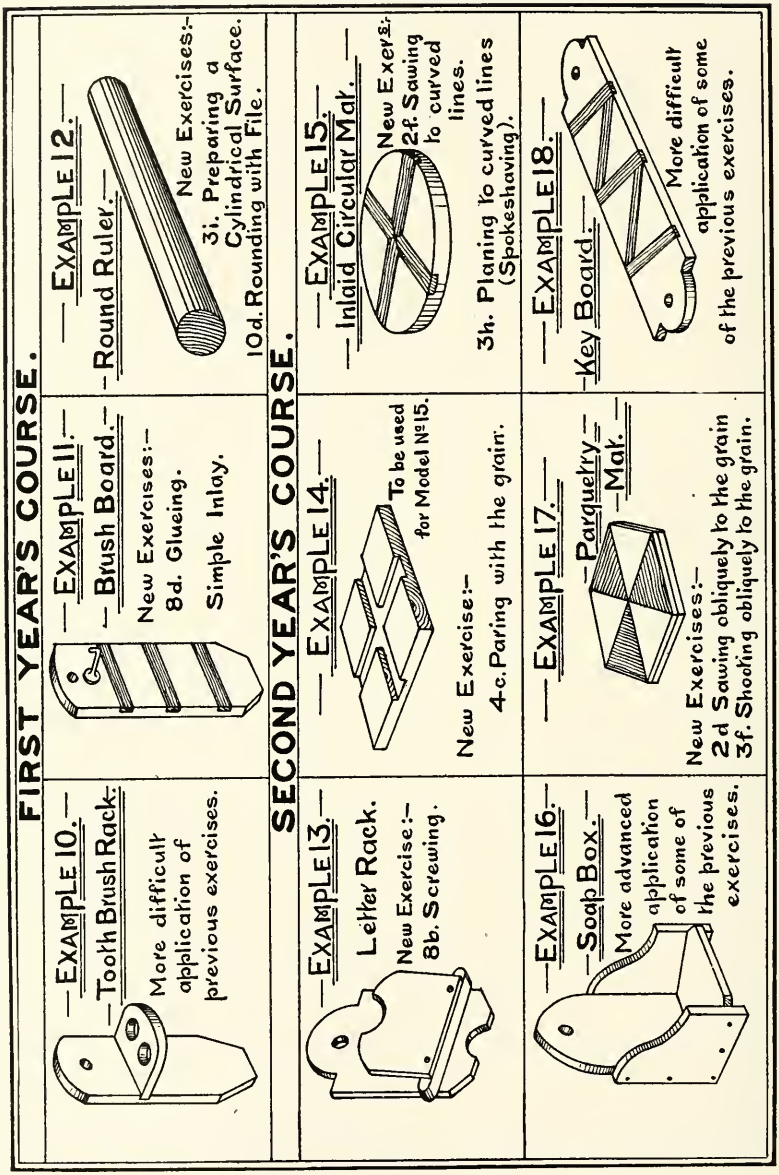

FIRST YEAR'S COURSE.
—EXAMPLE 10.—
—Tooth Brush Rack.
More difficult application of previous exercises.
—EXAMPLE 11.—
—Brush Board.—
New Exercises:—
8d. Glueing.
Simple Inlay.
—EXAMPLE 12.—
—Round Ruler.—
New Exercises:—
3i. Preparing a Cylindrical Surface.
10d. Rounding with File.
SECOND YEAR'S COURSE.
—EXAMPLE 13.—
Letter Rack.
New Exercise:—
8b. Screwing.
—EXAMPLE 14.—
To be used for Model No. 15.
New Exercise:—
4c. Paring with the grain.
—EXAMPLE 15.—
—Inlaid Circular Mat.—
New Exers:—
2f. Sawing to curved lines.
3h. Planing to curved lines (Spokeshaving).
—EXAMPLE 16.—
—Soap Box.—
More advanced application of some of the previous exercises.
—EXAMPLE 17.—
—Parquetry— —Mat.—
New Exercises:—
2d Sawing obliquely to the grain
3f. Shooting obliquely to the grain.
—EXAMPLE 18.—
—Key Board.—
More difficult application of some of the previous exercises.

FIG. 42. WOODWORKING PROBLEMS, FIFTH AND SIXTH STANDARDS, SHEFFIELD.

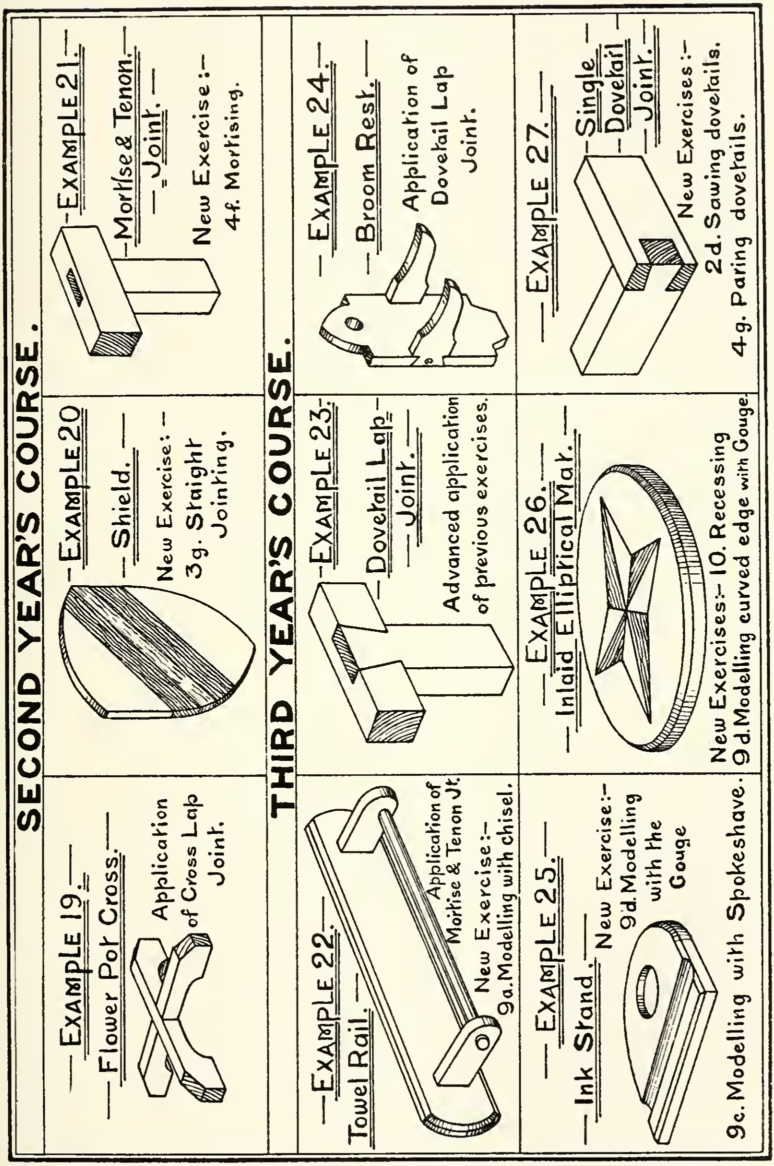
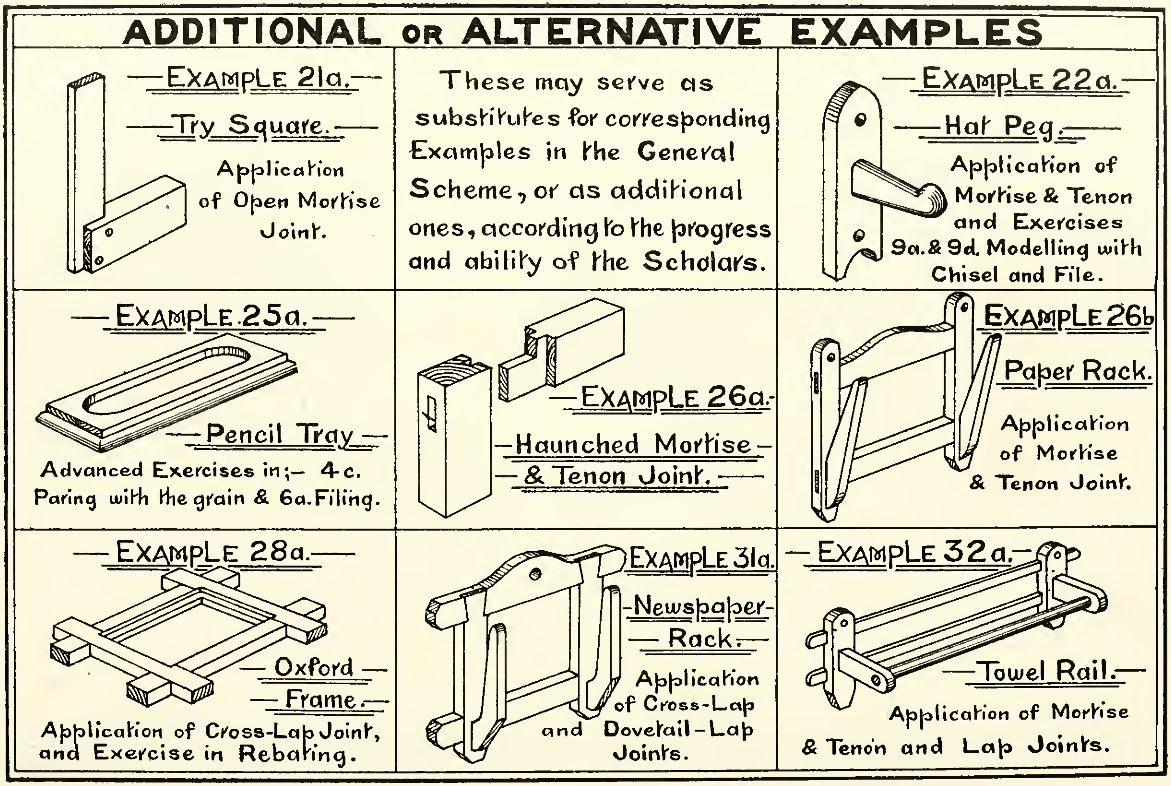

SECOND YEAR'S COURSE.
Example 19.
Flower Pot Cross.
Application of Cross Lap Joint.
Example 20
Shield.
New Exercise: 3g. Straight Jointing.
Example 21.
Mortise & Tenon. Joint.
New Exercise: 4f. Mortising.
THIRD YEAR'S COURSE.
Example 22.
Towel Rail.
Application of Mortise & Tenon Jt.
New Exercise: 9a. Modelling with chisel.
Example 23.
Dovetail Lap Joint.
Advanced application of previous exercises.
Example 24.
Broom Rest.
Application of Dovetail Lap Joint.
Example 25.
Ink Stand.
New Exercise: 9d. Modelling with the Gouge
9c. Modelling with Spokeshave.
Example 26.
Inlaid Elliptical Mat.
New Exercises: 10. Recessing
9d. Modelling curved edge with Gouge.
Example 27.
Single Dovetail Joint.
New Exercises: 2d. Sawing dovetails.
4g. Paring dovetails.

FIG. 43. WOODWORKING PROBLEMS, SIXTH AND SEVENTH STANDARDS, SHEFFIELD.



ADDITIONAL OR ALTERNATIVE EXAMPLES

—EXAMPLE 21a.—
—Try Square.—
Application of Open Mortise Joint.

These may serve as substitutes for corresponding Examples in the General Scheme, or as additional ones, according to the progress and ability of the Scholars.

—EXAMPLE 22a.—
—Hat Peg.—
Application of Mortise & Tenon and Exercises 9a. & 9d. Modelling with Chisel and File.

—EXAMPLE 25a.—
—Pencil Tray—
Advanced Exercises in;— 4c. Paring with the grain & 6a. Filing.

—EXAMPLE 26a.—
—Haunched Mortise—
—& Tenon Joint.—

EXAMPLE 26b
Paper Rack.
Application of Mortise & Tenon Joint.

—EXAMPLE 28a.—
—Oxford—
—Frame.—
Application of Cross-Lap Joint, and Exercise in Rebating.

EXAMPLE 31a.
-Newspaper-
—Rack.—
Application of Cross-Lap and Dovetail-Lap Joints.

—EXAMPLE 32a.—
—Towel Rail.—
Application of Mortise & Tenon and Lap Joints.

FIG. 44. SUPPLEMENTARY PROBLEMS IN WOODWORKING, SHEFFIELD.

From this building we went to the Duchess Road School, Fig. 40, which was the first manual training center for elementary school pupils opened in Sheffield. This was in 1891 soon after Mr. Boxall came to Sheffield from London where he had been one of the four original men who started the manual training work for the boys of the London Board Schools, Mr. Boxall being assistant to Mr. Pearson and Mr. Whillier assistant to Mr. Barter. In this center the system of keeping the tools on boards hung around the room is still in vogue, but unlike the boards in some cities, each of these holds a full set of tools for a bench. On the benches I saw some of the original vises used—very heavy, vertical, carpenter's vises.

In this school I noticed that each boy recorded a mark for each of his own pieces of work, both in drawing and woodwork, and then the teacher's mark was placed beside it. Usually the two were alike. In the two record books I examined only one mark by a boy was lower than that of his teacher; many were higher. In such cases the pupil had impressed upon him the reason for the difference. In some cases the succeeding marks indicated that the boy's standard had been raised to that of the teacher's. This plan of marking is favored by the Board of Education inspector and is used in several other cities.

There are now 4500 boys taking manual training in Sheffield. A three-year course is given. Here, as in London, boys in standards below the fifth may take manual training if they are eleven years of age. Eight of the eleven centers in Sheffield offer evening work. This often takes the form of furniture construction. In age the evening class pupils range from fifteen to fifty. It is really continuation school work.

The character of the course for the elementary schools is indicated by Figs. 41, 42, 43, and 44, taken from the "Scheme of Manual Instruction in Woodwork," published by the City of Sheffield. As will be seen by Fig. 44, additional or alternate problems are provided. In other words, there are more problems in the course than can be worked out by any one pupil in the time allotted. All the toolwork exercises are taken by every boy, but the problems assigned are suited to individual abilities.

The four-fold aim of the manual training work as stated in the syllabus is, (a) "practical utilization and development of the drawing done in the upper standards of the day school; (b) application of knowledge gained in arithmetic and science; (c) training of the hand, eye, and mind in principles and methods which will be of value to the scholars in after life; (d) to teach the simple elements of construction." The technic of the course is in harmony with Mr. Boxall's book, "The Woodwork Scholar's Guide in the Use of Tools," an admirably illustrated book on the use of woodworking tools.

Just before noon I called on Professor Ripper, head of the Technical Department of the University of Sheffield, spending a pleasant half-hour with him in going thru the shops of his excellent school. My chief purpose in meeting Professor Ripper was to ask him some questions concerning the beginnings of manual training in England. He said that so far as he knew the Sheffield Grammar School, in which he was a science master, and the Allan Glen School of Glasgow were the first in the kingdom to introduce systematic shopwork.

QUESTIONS OF METHOD AND ORGANIZATION.

In the afternoon we went first to the Philadelphia School Center where the room is lighted by a skylight. Here a class of boys was listening to a demonstration by the teacher. In reply to a question, Mr. Boxall said that when he first began the work nineteen years ago he gave the maximum of class instruction, trying to keep the pupils together in their work. That did not work well, especially after they began to put beginners into classes with advanced pupils, so he adopted the individual instruction method. That, however, did not prove satisfactory and he

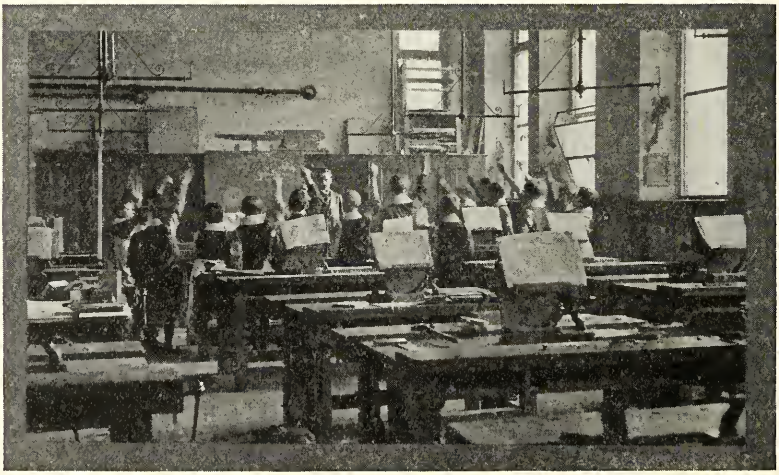


FIG. 45. UPPER THORPE MANUAL TRAINING CENTER, SHEFFIELD.

has more recently used a combination of the two, giving class instruction whenever it can be done to advantage. This is facilitated in a center with forty pupils where a head teacher and an assistant are employed; one teacher can pick a group for class instruction while the other takes care of the remaining pupils. Mr. Boxall said in this connection that he did not like the centers for sixty pupils with two assistants—they are too noisy. He had reduced all such to forty-pupil centers.

We next went to the Upper Thorpe School, a forty-pupil center, where we found one section of the class receiving instruction from the regular classroom teacher, who in England, of course, is a man, Fig. 45, while the special manual training teacher had a smaller group together around a bench at the other end of the room and was showing them how to construct a model involving a cross-lap joint. For assistants in the forty-pupil centers in Sheffield the regular classroom teachers are employed. They come with their pupils, and for this service receive an extra five pounds a year salary. In order to receive this grant, however, the teachers must qualify in handicraft. The Board of Education has ordered that by 1910 all such teachers must be certified teachers of handicraft. One of the advantages claimed for this plan is better correlation with the other school work, and another is that it provides a means of selecting some of the best of these teachers to replenish the ranks of the special teachers of handwork. In the room just referred to the special teacher of shopwork was once a classroom teacher. In fact all of Mr. Boxall's permanent staff of twenty-one, with the exception of three, were elementary school teachers before they became special teachers of manual training. These three were mechanics. It requires about sixty of these classroom teachers qualified in handicraft to furnish a sufficient number of assistants in Sheffield. If the system were to be changed so that the classroom teachers were not employed in this way the permanent staff of manual training teachers would have to be increased to thirty-eight. I asked Mr. Boxall which kind of teacher he preferred, an elementary school teacher trained in handicraft or a mechanic trained in teaching. He answered, "both," by which I understood that he wanted the influence of both in the work.

VALUE OF NOTE-BOOKS IN MANUAL TRAINING.

Our last center to visit was the Mosley Street School, high up on a hill overlooking much of the city and the beautiful valley of the Don. Here we found a class of forty pupils in the hands of a special teacher who is a skilled mechanic with much experience in teaching, assisted by the regular classroom teacher, Mr. Lingard, one of the teachers who came to America with the Mosely party several years ago. We had not been in the room long before an interesting discussion began concerning the time taken for notebook work, theoretical instruction, information lessons, and drawing, which brought all four of us together. Both the special teacher and the classroom teacher agreed that there was not sufficient time devoted to manual training to give much attention to notebook work of any character, so they required very little done with the books provided for the boys. In their estimation the note-taking or written work in connection with the shopwork should be done in the classroom in connection with the other studies and under the direction of the classroom teacher. This statement was of special interest to me because the man who was advocating it and pointing out how he taught much about trees and timber in his geography lesson was himself the classroom teacher, and apparently a good one. He sent a boy out to get a piece of his composition work. The boy had written a paper describing the process of making a bracket shelf. It was logical and specific, even to the dimension of the pieces, yet the boy did not have the bracket at hand to measure when he wrote the paper. He didn't need to; he had made the piece in the shop and he knew the materials and the processes he was describing. He knew it so well that he could give his attention to deciding how best to express that knowledge. It was a profitable lesson in composition—far more profitable than a lesson in which he would be trying to express what he didn't know. We all know that hunting for something to express is not composition, but the training in composition comes in expressing what we have learned or thought out. The manual training can furnish much material for composition work which is especially valuable because the doing process organizes that material in the pupil's mind.

As usual Mr. Boxall was ready with an incident in the history of the Sheffield work, bearing on the point under discussion. He said that several years ago he was visited by an inspector who told him he wanted to have the boys during their first year in manual training learn to identify ten different kinds of wood, to know the trees in winter and the shape of their leaves in summer; he wanted a certain number of drawings made in orthographic and isometric projection; and so on, covering so large an amount of work in connection with woodworking that Mr. Boxall protested, telling the inspector that it was impossible, and that he could not do it. But the inspector was very insistent. Where the attempt was made to meet the inspector's demands hardly any woodworking was done during the year, and the requirement of the inspector was reported by local authorities to the Board of Education. The next year's code contained the regulation that at least three-fourths of the time in manual training must be devoted to work at the bench with the tools. The feeling was strong that the equipment of the woodworking shop can be used to better advantage than in extensive note taking by the pupils who are too young to take notes profitably, and in learning science lessons that can be taught just as well without so much equipment.

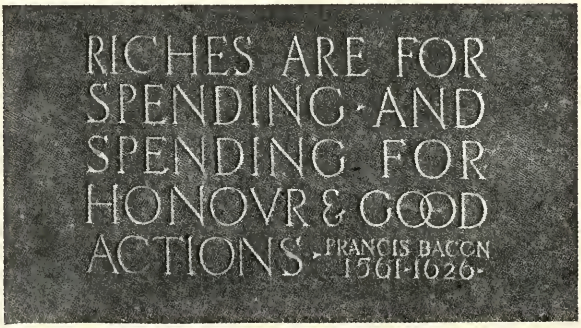
I called attention to the rules for planing which I saw in a notebook in another school that morning. One of the teachers expressed the opinion that the pupil should know these rules so well that having them in a notebook would be of no value to him. This brought to my mind the question of the purpose of note-taking: Is it to store up information for later use or to assist in the process of learning? So I asked why the teacher required the boys to sketch in their notebooks the cross-section of a tree from a drawing on the blackboard. In this case the teacher said the value was not in having a record to which the pupils might refer, but thru the drawing in fixing in mind the forms and names of the parts of the tree section. I found that this page was the only one in the book fully approved by the teachers and that this might have been made to better advantage on a sheet of drawing paper.

ENGLISH MANUAL TRAINING MORE THORO THAN AMERICAN.

Before I left this school I had a most helpful conversation with Mr. Lingard, the teacher who had been to America. I led him into a discussion of the comparative merits of English and American manual training. I found that he considered English manual training in the upper grades of the elementary schools much more thoroly done than that of the corresponding grades in America. I asked why this was so. Was it due to our courses? or to our teaching? or to our children? He promptly said to our teaching. He said that work is readily accepted by the teacher in America that no English teacher would accept. I agreed with him that in general this was true. (I confess, however, that I was somewhat relieved to learn that he had not been west of Buffalo.) He said that he thought that the lack of thoroness might also be due in part to the fact that in America we have all classes of society represented in the same class in school which in itself makes the problem of the teacher more complex. He said that if he knew that six or eight of his twenty boys were to become doctors or lawyers or clerks he would look upon his problem in a different light, but in a Sheffield Council School he was almost sure that every boy would earn his living at some kind of manual employment and that he would be working under the direction of some other person. For that reason the boy must be taught to follow directions explicitly and do his work with thoroness. This statement of the English teachers' problem seemed to explain several things that I had observed in the English work, but Mr. Boxall did not seem to give much credence to the theory that lack of thoroness in American teaching was due to different social classes being together. He would prefer to believe that the lack of thoroness may be due to having so many women teachers in the upper grades of American elementary schools. I agreed with him in the opinion that we need more men to teach boys in our grammar grades, but I did not stop to remark that in America thoroness is not entirely a matter of sex. At that moment we were passing outside the high stone wall of the school yard into the full view of the deep valley and the hills beyond. The beauty of the scene crowded out of my mind all questions of pedagogy and social differences.

A pleasant walk of ten minutes or so brought us to Mr. Boxall's home. After tea I took the Midland Express to Leeds.

(*To be continued.*)



CUT IN STONE AT THE MUNICIPAL SCHOOL OF ART IN LEICESTER

SUGGESTED STANDARD HIGH SCHOOL COURSES IN WOOD-TURNING, PATTERN-MAKING AND FOUNDRY PRACTICE.

RAY L. SOUTHWORTH.

AS the subject matter in the teaching of the manual arts has been introduced and developed in the various communities of the country, we find quite a variety of aims and projects, but the fundamental principles and processes are generally evident. In many instances, it is desirable to have an uniform outlined course in order to cover the fundamentals with economy in time and material or for a college entrance credit. With this end in view, the following suggested high school courses were presented and adopted at the Minnesota Educational Association in October, 1909, as being a representative standard for subject matter in wood-turning, pattern-making and foundry-practice.

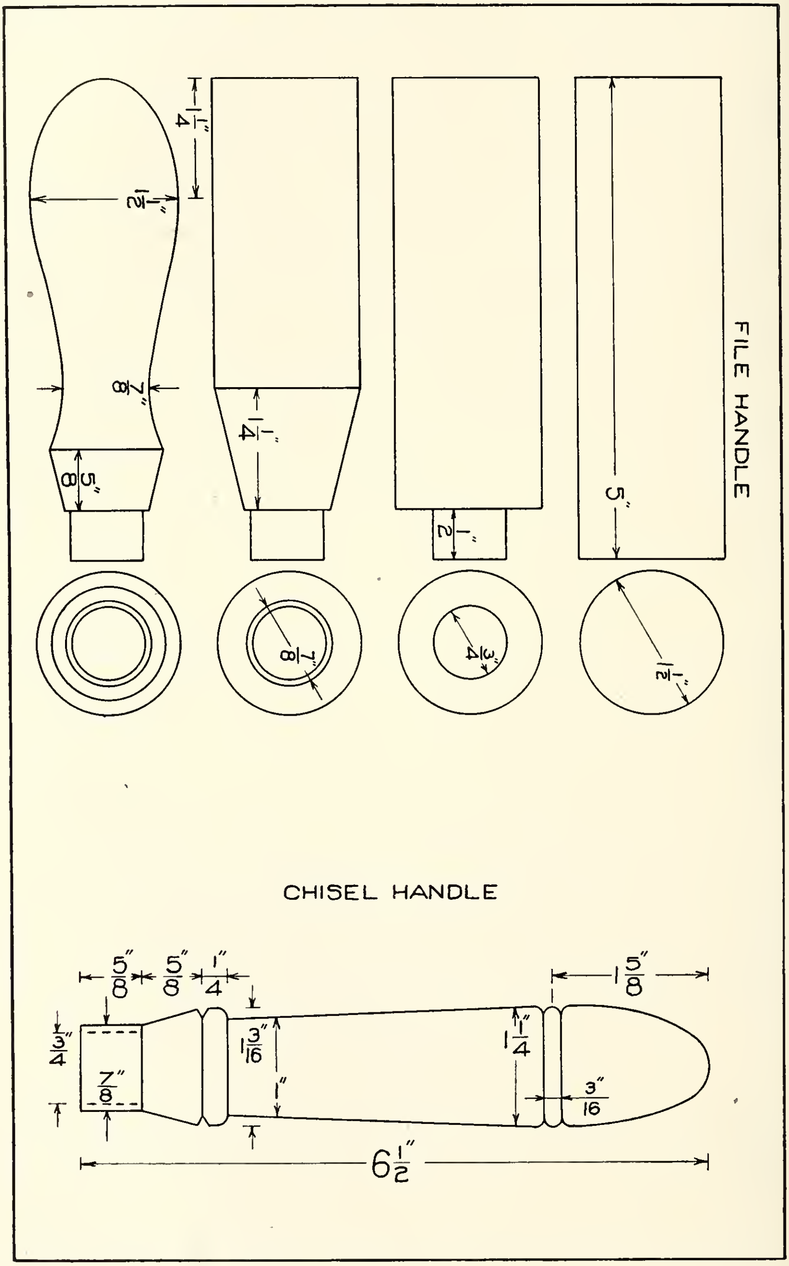
NOTE-BOOKS.

The note-book work herewith mentioned should be made interesting and its value in the present making or for future reference should not be underestimated by teacher or pupil. It is recommended that a note-book as durable and handy as the side-opening "Empire Reversible" be used, so that a pupil, going from one school to another during his high school course or entering a higher institution after completing any high school course, may present his note-book, with the instructor's signature, to the institution just entered. This evidence, with some oral questioning upon the fundamental principles of the subject as outlined in these courses, should insure the student's receiving full credit for work already completed and at the same time protect the institution.

WOOD-TURNING.

The aim is to give the individual an understanding of: (1) the tools and processes involved in wood-turning, (2) the typical application of these tools and processes. The time required is the equivalent of forty-minute periods, five times per week for a term of five months.

Subject matter for note-books in wood-turning. What is wood-turning; uses in the commercial world; the lathe, sketch of and parts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1 1/4"
1 1/2"
7/8"
5/8"
1 1/4"
1/2"
5"
7/8"
3/4"
1 1/2"
CHISEL HANDLE
5/8"
5/8"
1/4"
1 5/8"
3/4"
7/8"
1 3/16"
1"
1 1/4"
3/16"
6 1/2"

named; power transmission thru shaft, counter-shaft, clutch or motor, tight and loose pulleys, belts, speeds for different diameters; centrifugal force, vibration, lubrication, care of the lathe; lathe tools, uses, names of, (large gouge and skew chisel, small gouge and skew chisel, cutting-off tool, spear-point, round nose, scraper, and inside tools); holding tools and sharpening. Method of centering stock, roughing off, calipering, cutting off, turning between centers, positions of rest; face plate work; chucking and chuck work, sandpapering, finishing work in and out of the lathe.

Application of wood-turning. 1. File handle of soft wood. Tools used are large gouge, dividers, cutting-off tool and large skew chisel. The processes are: work between centers, centering, roughing off, laying out, turning a true cylinder, turning a recess, taper turning, concave and convex work with a large skew chisel, cutting off, and position of the rest.

2. Chisel handle of hard wood. Tools used same as above and small skew chisel. The processes are as above, also turning round edge beads, V-grooves, accurate recess work to fit brass ferrule, slight taper turning, sandpapering and finishing (oil and shellac).

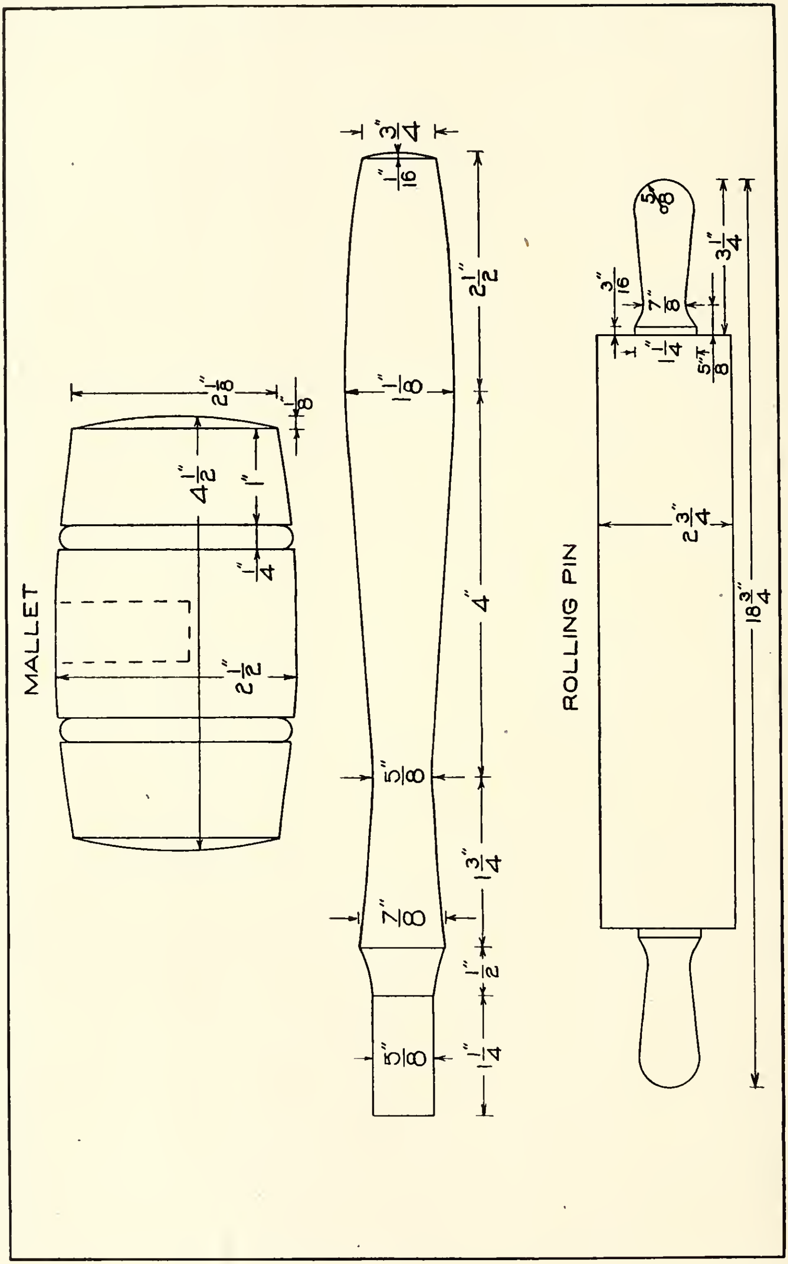
3. Mallet, of two pieces of wood. The tools used are same as above. Processes: change of speed for different diameters, accurate fitting of two parts, turning straight edge beads, slight convex turning, and convex facing with the large and small skew chisel.

4. Rolling pin. The tools used are the same as above. The processes are: use of the long rest, accurate turning of a long cylinder, square and smooth recessing, turning each handle, in duplicate, exactly to dimensions and curve, and concave work with the small gouge.

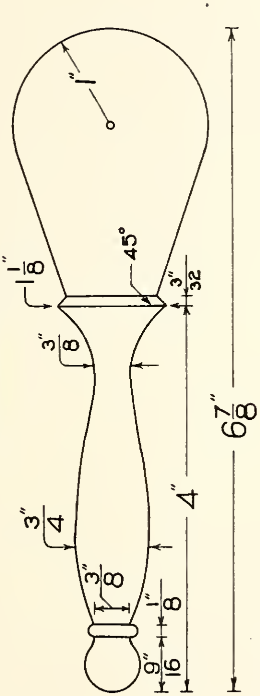
5. Darning-egg. The tools and processes are the same as above, but the problem is a final test for more delicate tool control, especially the gouge and skew chisel.

6. Gavel block. The new tools are the spear point, round nose and square scraper. The processes are: face plate work, chuck making and turning, and inside turning.

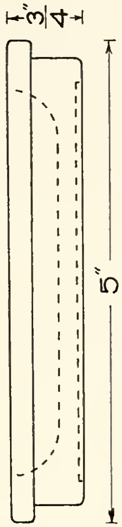
7. The following models are intended to involve individual initiative in applied design and construction. The aim is to keep in mind the interest of the pupil, to employ the fundamental processes in wood-turning and to present such projects as shall be of value to the home or to the individual. These problems are: gavel, candle-stick, pin-tray, card-plate, round box with cover, and plant or jardiniere stand.


MALLET
2 1/8"
1/8"
4 1/2"
1"
1/4"
2 1/2"
3/4"
1/16"
2 1/2"
1 1/8"
4"
5/8"
1 3/4"
7/8"
1/2"
5/8"
1 1/4"
ROLLING PIN
5/8
3/16"
7/8"
3 1/4"
1/4"
5/8"
2 3/4"
18 3/4"

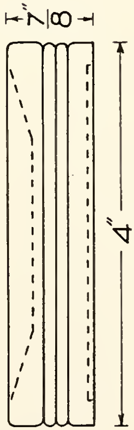
DARNING EGG

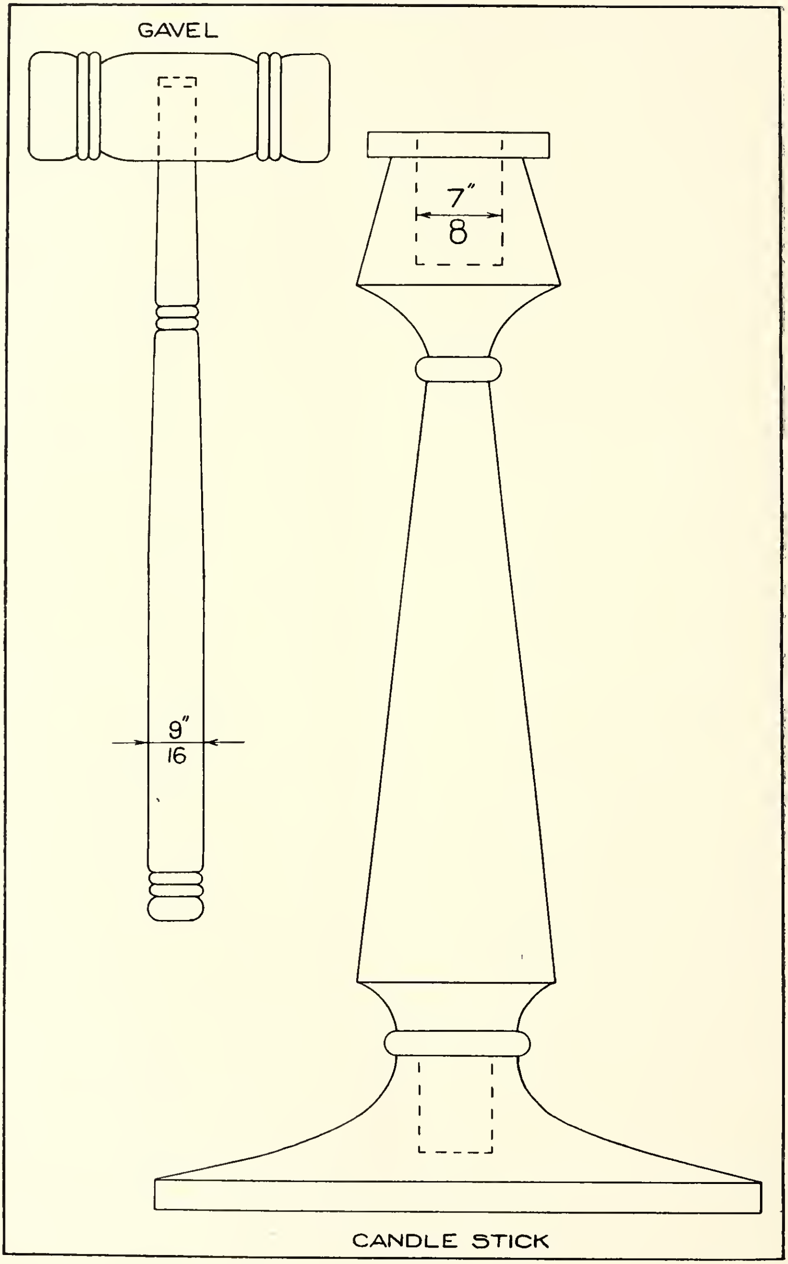

1"
1 1/8"
45°
3/32"
3/8"
4"
6 7/8"
3/4"
3/8"
1/8"
9/16"

PIN TRAY



GAVEL BLOCK




GAVEL
7"/8
9"/16
CANDLE STICK

Other problems may be substituted for any of those named in this course provided, that the educational and economic values are observed, that a sequence in difficulty is maintained in at least the first five projects, that the individual is given an opportunity to turn two or more projects of his own designing, and that all tool operations herewith given are involved in some suitable manner.

PATTERN-MAKING.

The aim is to give the individual instruction in tools and processes as applied to typical pattern-making. The time required is the equivalent of forty-minute periods, five times per week for a term of five months, to be shared between pattern-making and foundry practice.

Subject matter for note-books in pattern-making. What is pattern-making?; commercial uses; additional tools used in this form of wood working; wood suitable for pattern-making; draft, face, warping; built-up segment construction; shrinkage, shrinkage-rule; finish allowance, rappage, glueing; crystalization and filleting (necessity of and kinds); core, core-box making (half boxes and built-up sections); use of templets (thin wood and zinc); core prints, split patterns, dowels; metal patterns; finish of patterns, reasons for same, colors used for different metals; and free-hand sketches of typical pattern costruction.

Application of pattern-making. 1. Vise anvil. The processes are: bench work, draft, fillet, shrinkage, finish allowance, green sand core, and color finish for cast iron.

2. Face plate. The processes are: turning pattern, chuck work, core-print, coring and detached core-prints.

3. Core-box for face plate. Processes are: use of the pattern-maker's gouge, templet work, and dowels.

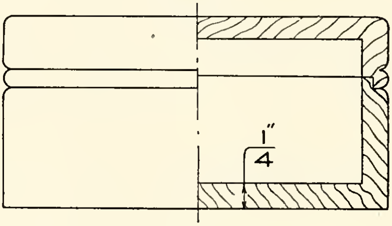
4. Hand wheel. The processes are: use of the turning lathe, face plate and chuck work, coping saw, and color finish for brass.

5. Globe valve. The processes are: use of split pattern; templet turning in the lathe, large attached core-prints, rigging split pattern stock for turning in the lathe.

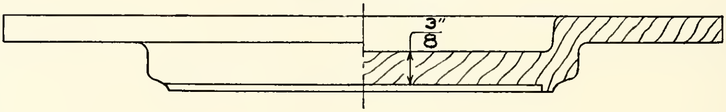
6. Step pulley. The processes are: segment cutting, fitting and glueing, and turning segment work.

7. Simplex dynamo-motor field. The processes are: combined bench and lathe work, use of templet and former, large green sand or own core, and double or reverse draft.

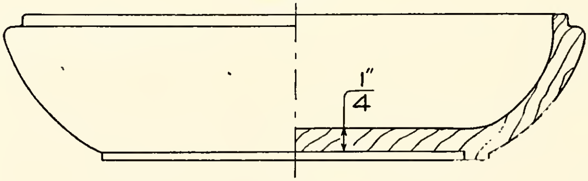
Other problems may be substituted for any of those named in this course provided, that the educational and economic values are observed, BOX



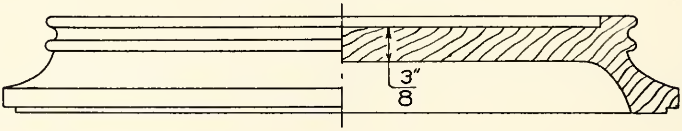
CARD PLATE



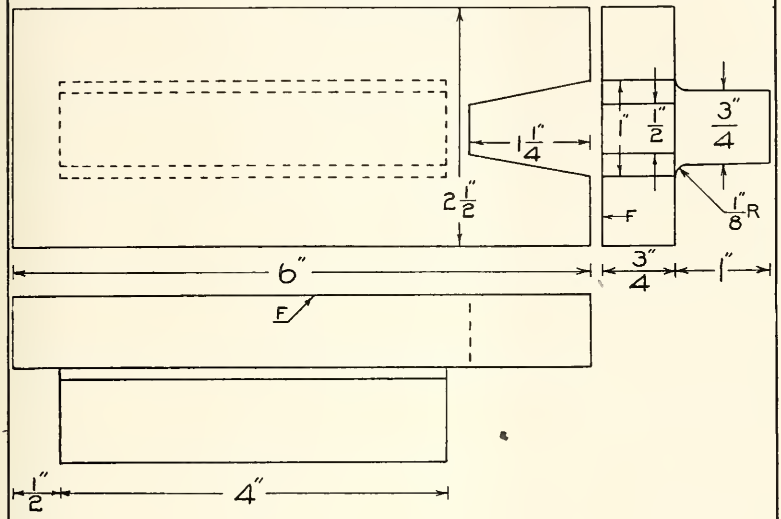
BOWL



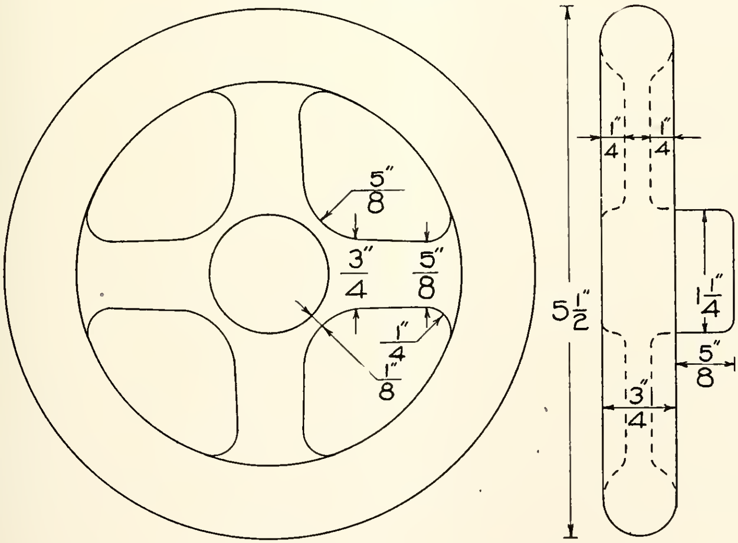
PLANT STAND

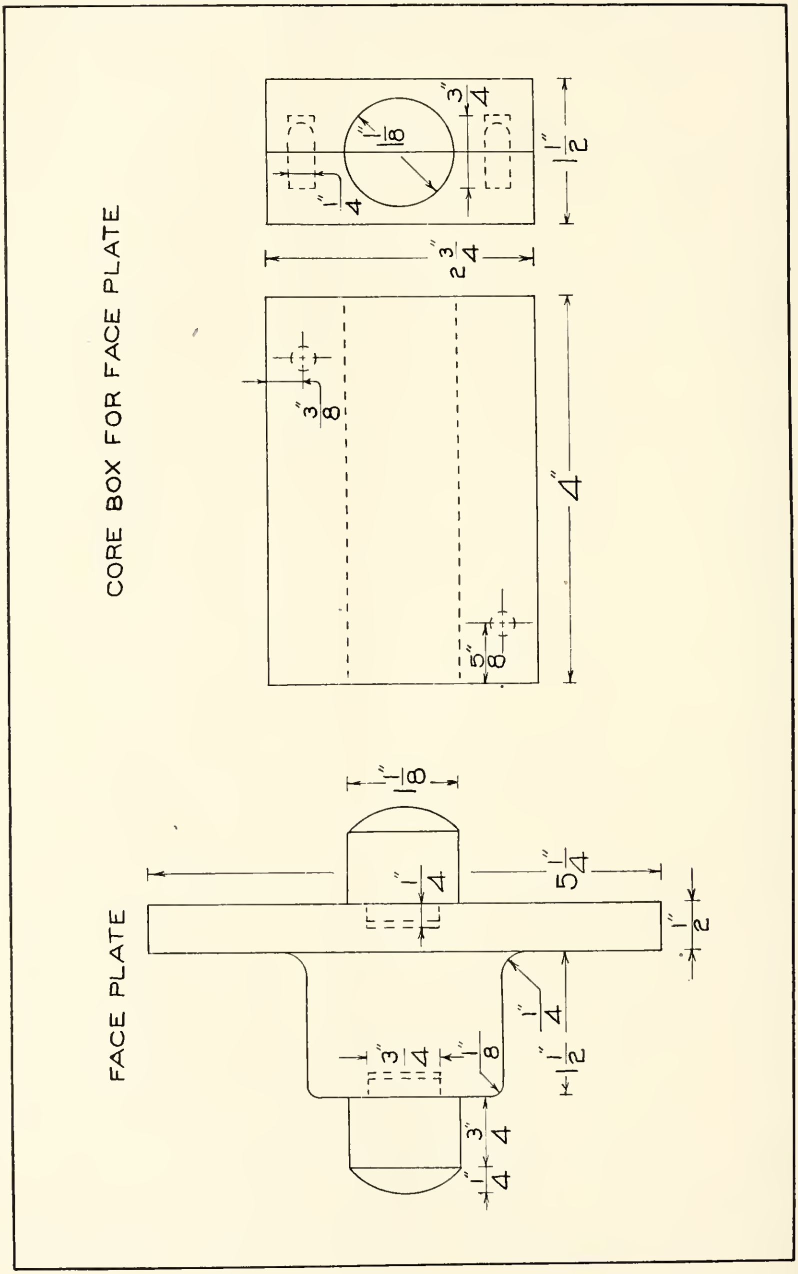


VISE ANVIL


1 1/4"
2 1/2"
1"
1/2"
3/4
1/8" R
F
6"
3/4
1"
F
1/2"
4"

HAND WHEEL


5/8"
3/4"
5/8"
1/4"
1/8"
1/4"
1/4"
5 1/2"
1 1/4"
5/8"
3/4"


CORE BOX FOR FACE PLATE
3/4"
1 1/8"
1/4"
1 1/2"
2 3/4"
3/8"
4"
5/8"
FACE PLATE
1 1/8"
5 1/4"
1/4"
1/2"
1/4"
1 1/2"
3/4"
1/8"
3/4"
1/4"

that a sequence in difficulty is maintained, and that all tool processes herewith given are included in some suitable manner.

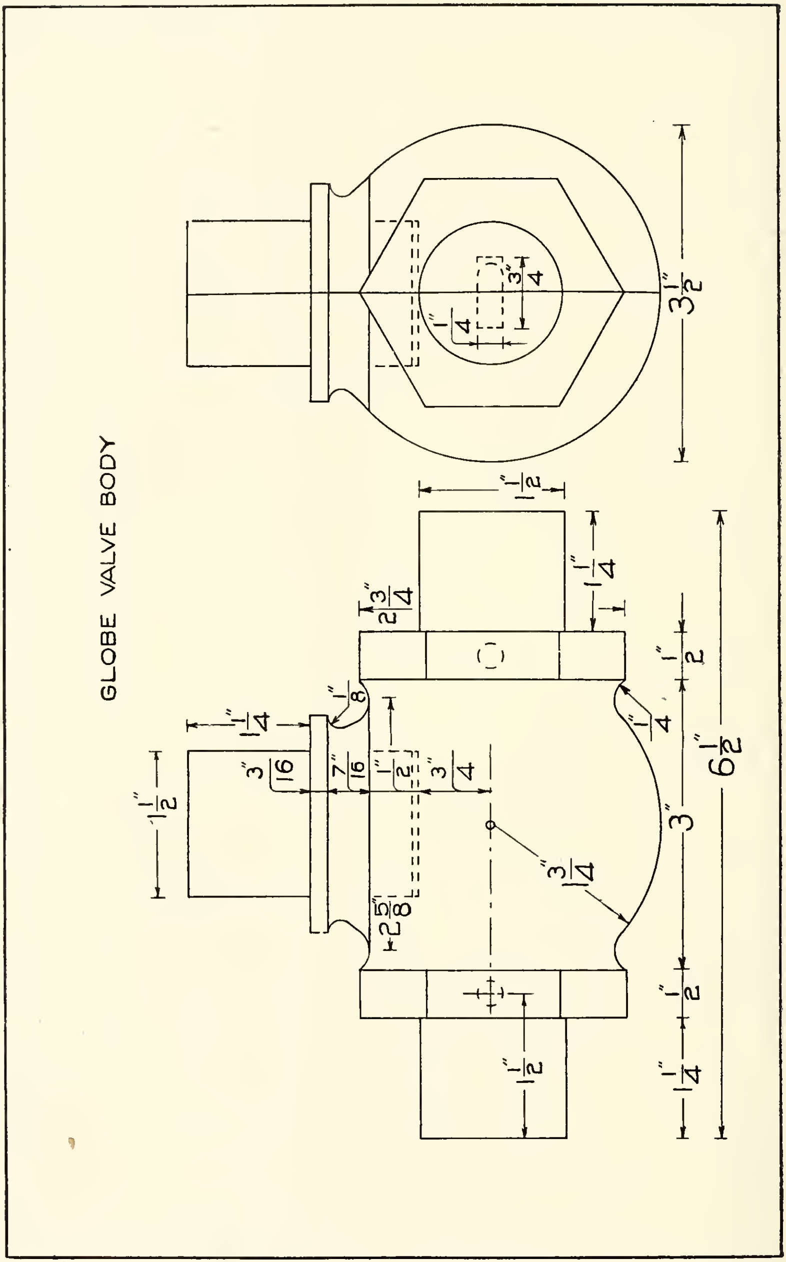
FOUNDRY-PRACTICE.

The aim is to give the individual instruction in foundry processes and practices involving the practical use of typical patterns, making of molds and casting in same, in lead. The time required is the equivalent of forty-minute periods, five times per week for a term of five month, to be shared between foundry-practice and pattern-making.

Subject matter for note-books in foundry-practice. What is founddry work?; necessity of in commercial and industrial construction; relation of wood-turning to pattern-making and why a successful pattern-maker should know how to make a mold and cast same; notes upon the most important cast metals, properties of and how used in machine construction; relation of the machine shop to the foundry, foundry to the pattern department and pattern-making to the mechanical drawing; appliances: mold, flask, snap-flask, molding or follow-board, pins, cope, cheeks, drag or nowel, clamps or dogs, wedges; parting line, rapping, drawing; tools: flask, riddle or sieve, rammer, trowel, lifter, slicks, swab, vent-rod, draw-stick, sprue, bellows; molding terms: ramming, venting, gating, pour hole, shrinkage heads, runner, casting, washing and patching; cores, green sand and baked; kinds of molding and when used, green sand, dry sand and loam; use of sweeps, sands, where and how obtained, properties of same; tempering and testing green sand; facing material, why used, advantages, materials used; parting sand, core making, core binders, venting and baking; loam cores; hangers and rigging for cores; gaggers, chaplets, overhang or movable part pattern molds; common casting metals, melting points; reverbatory furnace and cupola, molding machines; cause of blow holes, porous spots, cracks, scabs, cold shuts or swells, buckles, soft and hard castings; comparative weight of pattern and casting; chilled castings; cost of castings; and free-hand sketches illustrative of typical foundry processes.

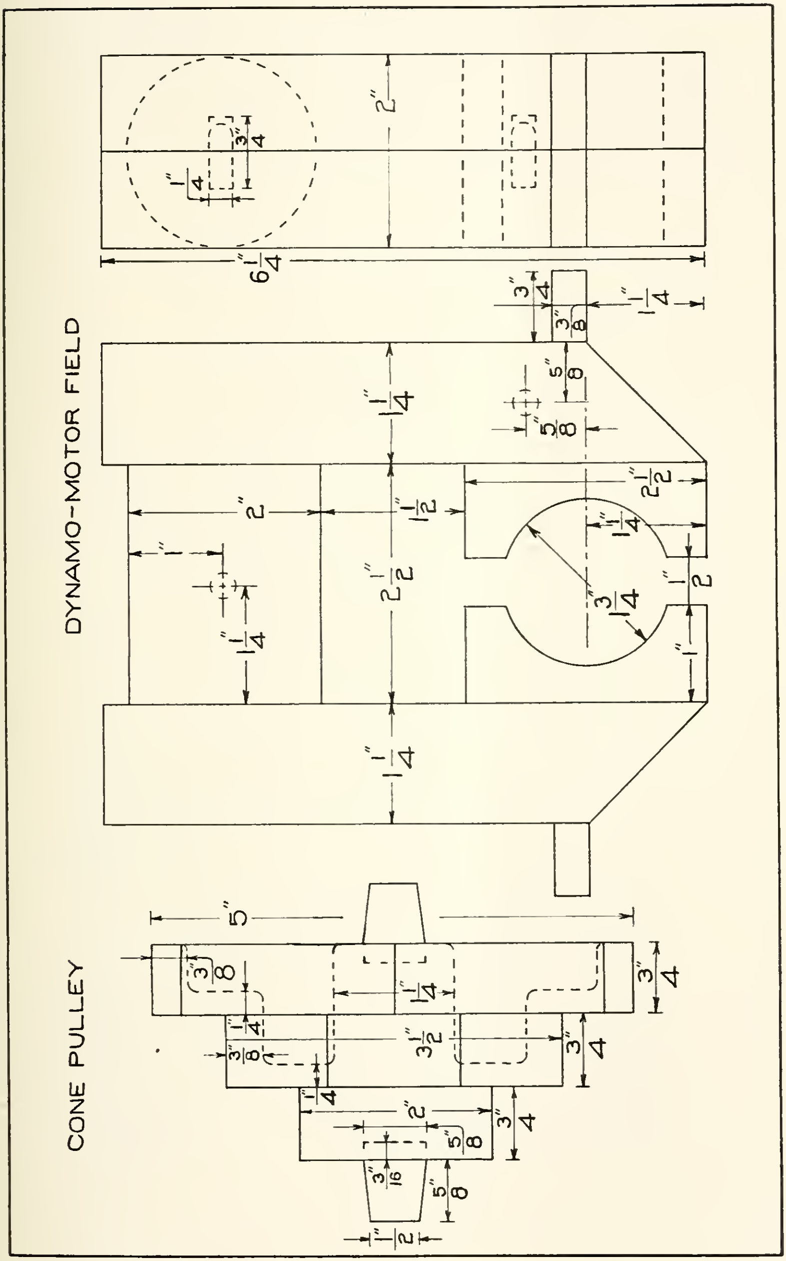
Typical application for foundry-practice. Each pupil is to be required to mold at least three of his own patterns. One of these is to be his first pattern, and the second a pattern with core-box and core construction; to be cast in lead or other more suitable alloy, if casting in brass or iron is not practicable.

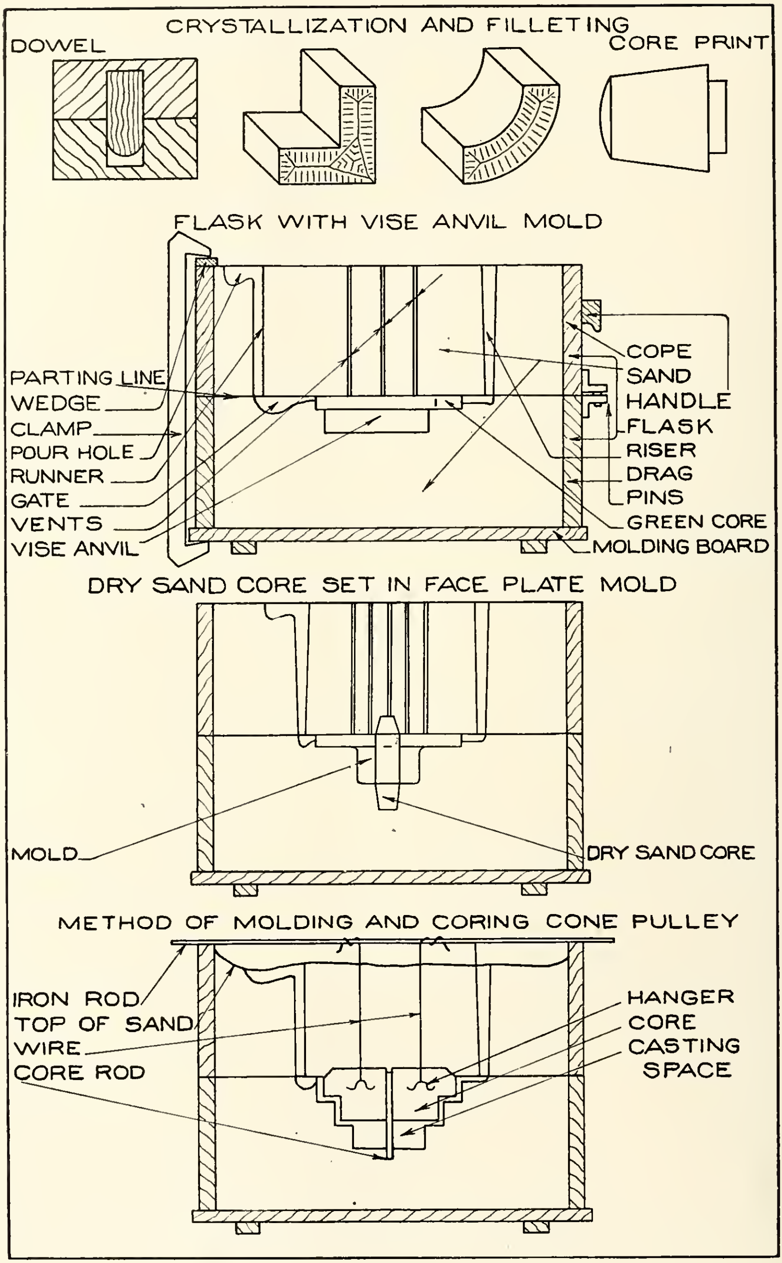
The plate showing molds and foundry terms is suggestive of the kind of sketches that should be made in connection with the note-book work in foundry practice.



GLOBE VALVE BODY

3 1/2"
3/4"
1/4"
1 1/2"
2 3/4"
1 1/4"
1 1/2"
1/4"
1/8"
3/16"
7/16"
1/2"
3/4"
1/2"
1/4"
3"
3 1/4"
2 5/8"
6 1/2"
1/2"
1 1/4"
1 1/2"


DYNAMO-MOTOR FIELD
CONE PULLEY
6 1/4"
2"
3/4"
1/4"
1 1/4"
3/8"
5/8"
2 1/2"
1 1/2"
2"
1"
2 1/2"
1 1/2"
1 1/4"
1/2"
3 1/4"
1"
5"
3/8"
1 1/4"
3/4"
3 1/2"
2"
5/8"
3/16"
1/2"



CRYSTALLIZATION AND FILLETING

FLASK WITH VISE ANVIL MOLD

DRY SAND CORE SET IN FACE PLATE MOLD

METHOD OF MOLDING AND CORING CONE PULLEY

DOWEL
CORE PRINT
PARTING LINE
WEDGE
CLAMP
POUR HOLE
RUNNER
GATE
VENTS
VISE ANVIL
COPE
SAND
HANDLE
FLASK
RISER
DRAG
PINS
GREEN CORE
MOLDING BOARD
MOLD
DRY SAND CORE
IRON ROD
TOP OF SAND
WIRE
CORE ROD
HANGER
CORE
CASTING
SPACE

In the wood-turning course the file-handle in four steps was suggested by J. E. Painter, supervisor of manual training, Minneapolis. It has proven a good substitute for the usual models involving cylindrical, convex and concave exercises respectively. Of the mallet, rolling-pin and darning egg the design and origin are unknown. The card-plate, bowl, plant-stand and candle-stick were designed by pupils of the East High School, Minneapolis, under Miss Lavinia B. Sterrett, in the constructive drawing and design classes, and later turned in the shops. The other projects and the plate showing suggestive note-book sketches for foundry practice have been worked out by the author.

FROM TEACHERS COLLEGE, NEW YORK.

THE EDUCATIVE VALUE OF MANUAL TRAINING.[1]

S. HORACE WILLIAMS.

THE manual arts have a decided value with reference to the physical development of the child. Although this physical value is very real and positive, there are almost no figures to show with scientific accuracy the net gain of physical strength and development due to such training in the school. Such a test would be well-nigh impossible, for the growing child never limits his physical activity to that gained in the school,—a very fortunate thing from a physical and educational point of view.

THE PHYSICAL VALUE OF MANUAL TRAINING.

To the average child, the inactivity, the repression and the long periods of silent memory-work are extremely irksome and provocative of nervous disorders. He is at a period of life when mental growth is almost co-extensive with physical development; and the frequent rebellions which we see on the part of the child are primarily deep-seated in their origin and are a repudiation of the current educational methods, —not a conscious and wilful attitude of disobedience. It is easily comprehended then why most children love the work of the shop, why they come to their tool-work with such open delight and leave with evident reluctance. To open the shop before school in the morning, at noon or after the day's session,—to grant them an opportunity to work during the holidays, mean that the shops will be full, and that the day itself is not long enough for the child who is so eager to satisfy his hunger for constructive work with tools. Work in the shop increases physical strength, but this is not its primary value, for base-ball, rowing or gymnastics are far more effective in increasing the strength of the large muscles than manual training. On the physical side, the greatest value of manual training lies in the opportunity for that sort of muscular activity which will train the accessory muscles of the hand and arm; which will enable the child to assume many postures within a short period of time, and to increase the inhalation of oxygen, thereby inducing a better circulation of blood and a clearer mind.[26] Here the mind and body can and do work harmoniously in the educative process. Indeed, some of the exercises of the shop require vigorous exercise and deep breathing, such as sawing and planing heavy stock, working at the forge and moulding, while other exercises limit muscular activity to the small muscles, as for example, carving and drawing.

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[1] Begun in the October, 1909, number.

[26] Manual Training and Mental Development; MANUAL TRAINING MAGAZINE, Oct., 1899.

Professor Scripture[24] has been an advocate of both the idea of cross-education and the doctrine of "radiating practice." By the first is meant that exercise of the muscles of one side of the body will increase the efficiency of those on the other side as well, along the same line of activity. An experiment of this nature was given to demonstrate this fact: "Telegraph keys were so arranged that they registered the rapidity with which a person could tap them. On the first day both index fingers, and both big toes were tested. After that the right big toe alone was practiced for over two weeks. Then all were tested again. The results were as follows: Four of the persons tested gained on an average in the power of the right big toe by 33%. The unpracticed left big toe gained 31%: the right index finger gained 21% and the left index finger 31%." In his own language, the theory of radiating practice means that, physiologically speaking, the development of the center governing a particular member causes at the same time the development of higher centers connected with groups of members. This idea has been strongly contested during the last decade, until now, many of the most able psychologists repudiate it altogether. So it seems at the present time this theory has no strong support, but it is evident that the former proposition is more valid.

FATIGUE.

From tests taken in psychological laboratories, it has been estimated that over 95% of the fatigue which appears to be physical is in fact *mental* and not physical.[25] Voluntary attention upon subject-matter which does not interest the child soon lags and nervous energy seems at low ebb; the atmosphere of the room is tainted and circulation of blood is slow;— at these times, the muscles feel exhausted and weariness ensues. But these muscles will work almost indefinitely when subjected to electrical stimulation, altho they ceased to respond to normal excitation. This proves that fatigue is largely mental; that the child is capable of

[24] Consult J. H. Trybom: The Danish Sloyd System and Its Founders; vol. V, p. 137-140.

[25] See Adolescence, vol. I, pp. 149, 150.

much effective work under proper physical conditions, especially ventilation and the proper alteration of exercises and finally it proves that we need more scientific study of the problem of fatigue in order that we may arrange the daily program in a manner more economical of nervous energy.

THE PEDAGOGIC VALUE.

Several years ago Frank W. Ballou wrote an essay upon "The Present Status of Manual Training in the Public Schools of the United States,"[29] in which he presented data collected from 330 cities in regard to several important problems relative to manual training. Of these 330 cities, 215 had introduced manual training for pedagogical reasons, while only 50 had added it because of a popular demand. This fact leads us to the conclusion that manual arts have a pedagogic value which has already been recognized by many leading educators. They have broken away from the traditional course of things to introduce a line of work once considered a fad, which many predicted would soon pass away. It is our purpose, therefore, to discuss some of these reasons for the introduction of the manual arts. The pedagogic value naturally includes many of the points already discussed,—so that here they require only a passing mention. Superintendents saw its value from the standpoint of mental growth, physical development and the possibilities for correlation with other work of the school, giving the formal subjects more *vitality*. They realized the validity of the argument for expression to keep pace with impression and saw that the child needed a subject upon which he would bestow involuntary attention as opposed to the voluntary effort expended upon the formal work of the school.[30]

CORRELATION.

The correlation of manual training with other subjects should be upon a *natural basis*. Relationships should not be forced or irrelevant. Oftentimes, arithmetic can be made more vital; more interesting to the child by correlation with shop-work. Here the shop becomes a laboratory where experiments and measurements are carried on by students and teachers. This is also true in history work. Many students have struggled for hours over the description of the bridge constructed over the Rhine as portrayed in Cæsar's "Gallic War" without then gaining a clear conception of the bridge as actually constructed. When, however, the Latin class or part of it makes a bridge according to the description in the Latin, the class thereby gets a clear-cut notion of the structure and of the function of various parts which is hardly possible when studying it from the text alone. The correlation between manual training and the dramatic work of the school is especially important.[31] The students take great delight in the dramatic exercises and gain a real motive for much shop-work. Moreover, it is unnecessary to point out at length that tool-work without due correlation with art instruction and mechanical drawing would be isolated and lacking in vitality, for one of the primary aims of the manual arts is to unite the artist and artisan in one person. In the grammar grades, effective correlation can be realized between arithmetical work and the elementary exercises in construction. The use of the scale and of working drawings are of great educational value and later they prove to be intensely applicable to manual training work. In the high school, the opportunity for correlation with the department of physics is practically unlimited, especially in those schools where we find manual training following the approach of the mechanic-arts.

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[29] Present Status of Manual Training in the Public Schools of U. S.; MANUAL TRAINING MAGAZINE, vol. IX, p. 10.

[30] E. O. Sisson: Mental Results from Manual Training; N. E. A. Report, 1897, p. 744.

In many instances, manual training has so vitalized the school work, or has infused new interests into the minds of many boys that they reveal an added interest in other subjects. Although no statistics exist to show this,[32] the proposition has general validity because many teachers have noted this result in their own experience. We often see this new attentive attitude taken by students who were once indifferent. Manual training raises the tone of work in other lines of study. Teachers soon learn that boys delight in their shop-work and often punish them for negligence in formal work by holding them from the shop. This is a sample of pedagogical injustice which covers both individual weakness and bad, current educational practice. In regard to the problem of discipline in manual training, it is rational to believe that under a competent teacher it will be easier than in the formal class-room work. At the present time, in many cities manual training is looked upon as a relaxation which calls for little or no brain work,—as a pastime,—hence the students feel free on their own part, and on the teacher's they are not made to feel the serious nature of this work,—with the result that the discipline of the shop is often quite bad. Under an able teacher, however, discipline here is not difficult as a rule, for the boys are intensely interested in the work, and when they see that the teacher means business, little trouble along this line will arise.

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[31] Notable in the Ethical Culture School of New York City.

[32] Since writing the above, Arthur B. Mays of Dallas, Texas, has informed me of a statement made at Teachers College, Columbia University, several summers ago, by Dr. Stone. Dr. Stone remarked that he did not believe that time should be taken from the regular studies for the manual arts, but after having made an extended investigation of the work of 20,000 children from Boston to Chicago, he found that those children who devoted some time to the manual arts accomplished better work in the formal subjects than children who gave all of their time to the three R's.

In many places where manual training has been introduced, there has been a marked increase in school attendance. It is often true that students remain in school primarily to take manual training or industrial courses. In the investigation which Mr. Ballou made, he endeavored to learn what effect the introduction of manual training had upon school attendance. It seems that in the majority of cities replying to this question, the answer was to the effect that such courses increased the attendance,—and in some cases, the increase was very high. Some of the most notable examples of this positive good of manual training are:—Milwaukee has an increase of 25%; Louisville, 100%; Newport, R. I., stated that the boys outnumbered the girls in the High School; Menominee, Wisconsin, 50% in the High School; Pueblo, Colo. 20%; Fresno, California, 150% in elementary schools and 50% in the High School; and the superintendent of Racine said: "Manual training means better schools and better schools mean better attendance."

THE CULTURAL VALUE.

To many educators who hold the traditional idea of a liberal education, the statement that manual training has a cultural value seems preposterous. For them, the classic works of literature, the knowledge of history, ancient, and modern, and religious; philosophy and languages, music and art, are the recognized sources of a liberal education,—productions which represent the highest attainments of man in the various realms of intellectual activity. Broad and general training of this sort tends to produce culture and refinement, but inasmuch as its devotees live in a realm of abstractions; in the contemplation of what other men have accomplished in past ages; in the study of the finished products of

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[38] MANUAL TRAINING MAGAZINE, vol. IX, pp. 21, 22.

others—in the deeds, not in the doing—their information too often has a non-functioning relationship to their actual bodily and organic needs. Intellectual life in its purity generally means the isolated, visionary and anti-social life, which delights in the fantastic mental pictures of Keats or Shelly, but withdraws from the heart-throbs of the busy, pulsating world about them. Knowledge is gained apart from real, sensuous experience and the life of the imagination is over-taxed. Their intellectual needs are *acquired, not fundamental;* hence they have a less vital relationship to mental growth of a healthy nature than those needs arising from an inherent demand for motorization.[34]

CULTURE AN ARBITRARY TERM.

If we attempt to analyze the elements of a liberal education, we shall find it very difficult to distinguish between that knowledge which is strictly refining and cultural on the one hand, and that which is primarily coarse and materialistic on the other. That knowledge which is purely cultural, or absolutely materialistic, is an imaginary abstraction. There is no absolute standard of culture; hence the elements cannot be fixed and formal. In consideration of these facts, it is incumbent upon us to discard some of the notions of a liberal education, which have been handed down from generation to generation, and to accept a new interpretation of all knowledge as such. It is possible and conspiciously evident that knowledge gained by sensory-motor experience can be and is of great cultural value even though it has reference to materials and processes. In an essay, Professor Dewey has brought out this idea with characteristic force. He says: "It is a serious error to think of occupational activities as if they were merely of prosaic and utilitarian or even commercial value. Their primary value is educational. It consists of training the thinking of the boys and girls in connection with things that appeal to them as worth doing, instead of training thought-power by partly formal tasks and gymnastic exercises. It does not exclude, but includes a broad and liberal scheme of knowledge. All typical, social occupations rest upon scientific insight and information. One of the chief values of shop-work, weaving, gardening, etc., even in elementary schools, is that they introduce the pupil to natural facts and forces and give him a motive for becoming thoroughly acquainted with the concrete facts and laws of nature. The historic development of the occupations by which men have subjugated nature by learning its secrets, and have learned to coöperate with another for common ends, gives the key to the study of history; it indicates what is important and what is trivial in the mass of facts that has come down from the past. An adequate mastery of typical occupations brings the pupil to a study of the social conditions and aims of the present; to facts which, when classified, form sociology, political economy, civics and politics. The fine arts are naturally included; for as Morris and others have pointed out, all embodiment of ideas in external form, when done freely and with joy in the activity, tend to gain an artistic quality. In short, there is nothing of science, history or art which the educational experience of the past has shown to be of worth which an occupational education would not include. Old values would be conserved, but would be centralized about a new principle and acquire the vitality of a new motive."[35]

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[34] Refer to Adolescence, vol. I, p. 174, *seq.*

In 1904-'05, Professor James M. Cattell, of Columbia University, wrote an essay in which he made the statement that the important problems of education are to discover individual differences, to preserve and to develop useful traits and to assign men to that sort of work for which they are best fitted.[36] In the past, the school has endeavored to mould all minds alike, despite individual differences; it has ignored the preservation of useful characteristics,—generally crushing out all instinctive tendency for constructive work and motor expression, and has not made a conscious effort to point out to the adolescent child his special aptitudes and encourage him to increase his efficiency along definite lines for social service.

The manual training department of the school offers to the adolescent child an excellent opportunity, in many instances, to discover his individual and peculiar bent of mind or proclivity; to conserve and to develop this natural reaction and thus to prepare for his special niche in the world's work. By long and careful observation upon the part of the teacher, special aptitudes can be discovered among the students as well as open weaknesses along constructive lines.[37] The shop should become a place where the process of elimination is as active as the process of selection, for many of the students who come to the shop are better fitted by nature for academic or for commercial work. This attitude toward the child should be assumed in all departments of the school, not in the work-shop alone. But for its effectiveness in discovering

[35] Dewey: Essay in "Progressive Education," 1908-9.

[36] Popular Science Monthly, vol 66, p. 367.

[37] See also article by Dr. D. S. Snedden, MANUAL TRAINING MAGAZINE, vol. X, pp. 1-9.

natural inclinations, the shop has the advantage many times over the other departments, for it takes cognizance of motor as well as mental experience. Since the average and normal child is predominantly motor, the shop takes hold of this trait at the psychological moment and becomes a powerful factor in aiding the boy or girl to decide upon his or her future work.

VOCATIONAL TRAINING.

With these general principles in view, many manual training centers now aim to make the shop-work of the seventh, eighth and ninth grades vocational. Some schools introduce this sort of work below the seventh and extend it above the second year of the high school. The chief differences between this vocational work and the average manual training courses are that a special degree of attention is given to those mechanical and industrial processes which have a vital relation to the activities and industries of the community or to the industrial world, and also to make the student efficient in a number of these processes so that he will possess a reasonable degree of skill.[55] The primary aim is to give the child industrial intelligence so that when he becomes a laborer, he will not become a mechanical, automatic, human machine, but will retain his human element which will enable him to be master of the machine that he directs. Since the great majority of school children never go beyond the seventh and eighth grades, society owes them some preparatory training along some line which will render them more efficient and self-reliant. These children will one day become either men and women who will consume more than they produce, or they will produce more than is needed for individual consumption. They will be either a benefit or a charge to society; hence, it is of paramount interest to society to do all in her power to render the future generations able and intelligent producers.

Such considerations lead one to ponder over the philosophy of the movement for industrial education. Progressive educators have objected to that class-education which offers only formal courses and elaborately equipped high schools to a selected group of students destined for the college and the university. Such an educational system fails to recognize the needs of those who must enter the industries. Just so; when we train students along industrial lines, we are using public funds to educate them for the benefit of a limited class—the captains of industry, whose fundamental and often sole aim is to amass a fortune,—

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[55] Read in this connection the Massachusetts Report on Industrial Education.

regardless of the human debris beneath it. Yet, in offering this industrial training, we must not forget that in order to attain our ideal of an industrial democracy, men must be trained both in democracy and in industry.[39] With the increase of intelligence and mental power, dependence and abject submission of one to another decrease. With the acquisition of intelligence, poverty tends to be eliminated and social betterment ensues. Although it does appear to be class-education to offer industrial training, yet, when we consider the broad social meaning of such an education and the inevitable result of increased intelligence among the people, we must admit that much social progress will be realized by virtue of such educational opportunities.

It is not the purpose of manual training leaders to depreciate the development of the imagination or of the higher intellectual life; yet, it must be admitted that many children early tend to exhibit an abnormal imaginative life. No more is it our purpose to prove or to disprove the existence of a spiritual experience apart from mental phenomena, but we shall assume that man has imaginative, intellectual or spiritual life of a very high order which is strongly influenced by motor training. By the spiritual value of manual training is meant the tendency which such training reveals to render mental activity of the highest order reasonable and normal. This mental activity especially deals with the contemplation of forces outside the self; the exaltation of an ideal or God and consequent self-abnegation. Such mental activity has often led an individual astray, so that finally he lives in a world of abstractions. Being drawn further and further all of the time from reality as we know it through sense-experience, such an individual becomes a mystic, a dreamer and is an imbecile when he comes to live the life of his fellow-men. Professor Charles R. Henderson, of the University of Chicago has said: "It is the close atmosphere of the solitary which stifles the spirit. Sanity and spiritual vigor are with those who train themselves to form wood, metal and stone into shapes which materialize the spiritual vision."[40] Healthy imagination and spiritual insight require contact with man and matter for normal growth.

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[39] Prof. Davenport, Univ. of Ill.: Education for Efficiency.

[40] Henderson: The Manual Training School as a Factor in Social Progress; MANUAL TRAINING MAGAZINE, Oct., 1900.

[*Concluded.*]

EDITORIAL

THE December number of the *Educational Review* contains a thought-stimulating article by Dr. James E. Russell of Teachers College, New York City. This article is sure to arouse discussion because it presents a plan for the reorganization of the subject-matter of public school education, and because it sounds like a report on changes that are known to be taking place at Teachers College. The title of the article is "The School and Industrial Life." It proposes that all instruction in the public schools be classified under three heads: (a) The humanities, including language and literature, history and civics, and the fine arts; (b) the sciences, including mathematics, geography, physics, chemistry and biology; and (c) the industries, including the study of materials and the dominant processes in the successive stages of production, manufacture, and distribution.

Industrial Arts in Place of Manual Training.

Under such a classification manual training, fine arts, domestic arts, and domestic science would drop out of the curriculum below the seventh school year, and in their place would be one subject called industrial arts, which would cover the elements of the industries. In this scheme for the first six grades there would be no hours set apart in the program for handwork, but manual processes would be used as a means in teaching most of the other school subjects, which, we understand, would include the industries. Manual training, if the term were retained at all, would refer merely to a method of teaching instead of to a subject with a definite content of its own. Thus the author takes us back several years to an old familiar question.

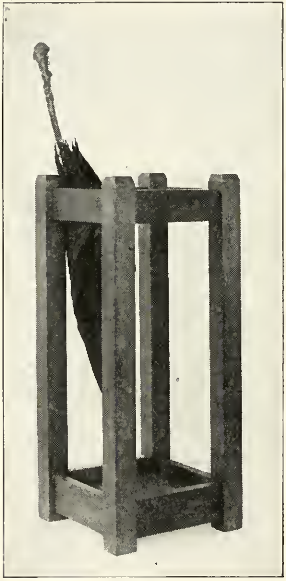
Probably most teachers of the manual arts will agree with Dean Russell that in the first two or three grades all the subject matter of the school should be served in one large dish, as it were, like a New England boiled dinner of our youthful days, rather than in Frenchy dishes *table d'hote,* but there comes a time when it is more appetizing to separate the instruction into subjects. As the work advances from grade to grade it becomes more and more separated, more specialized, and we believe that before the seventh grade, even before the fifth, manual training and drawing, or the manual arts, or handwork, is best considered as a fundamental division of subject matter. Certainly in the fifth and sixth years when using clay we would prefer to teach the technic of clay modeling as a subject, and when using paper and strawboard and leather we would teach the technic of bookbinding. We would teach bookbinding as a subject, not merely because the books bound are useful to the child, nor merely because design can be applied in bookbinding, but also and largely because bookbinding affords an opportunity, thru organized and wisely directed practical work with hand tools and materials, to form habits and to acquire an appreciation of processes and quality of workmanship in an important group of industries which are valuable on both the vocational and the cultural side of education.

The Essence of Manual Training. Right at this point we believe that Dr. Russell makes a serious error in his estimate of manual training and what it has done up to the present time. He more than implies that in manual training there is nothing definite to teach nor is there a consistent way of teaching it. He says: "subtract from our present manual training course that which is essentially applied design and those exercises which are intended to afford motor expression in the learning of other subjects in the curriculum, and what is left is an incoherent, unorganized series of projects without purpose or educational value." We cannot see how this is true of any manual training worthy of the name, and we cannot believe that this is true of the manual training at Teachers College and in the schools taught by its graduates. If it be true, then manual training has been led so far astray by its would-be friends that it has lost its real course. In 1832 the manual labor movement in this country collapsed largely because handwork in the school was unorganized. Tool processes had not been analyzed and put into pedagogic form. The manual training movement which began in 1880 has grown and increased year by year because from the beginning until now, in manual training work worthy of that name, tool processes have been analyzed and taught as such, and from this teaching there have come large returns in habits formed and practical power gained, which have been recognized not only as of general educational value, but as the very foundation stones of industrial efficiency. A manual training course that is based upon or has running thru it a rational analysis of tool processes fundamental in the industries cannot fairly be said to be either incoherent or unorganized. It is true that the course may appear incoherent to one who does not see beneath the surface, but that is sometimes true of good courses in other subjects. To say that manual training is "little more than applied design" is certainly to fail to appreciate the very essence of the subject. While it is true that applied design has come into manual training in America during the past few years and that it is now coming into the manual training work in Germany, it certainly ought not to be true that it is taking the place of the fundamentals that were there before. What applied design can and is doing, however, is to add needed elements of enrichment. We want more applied design of the right sort in manual training work, but it can never take the place of the systematic, thoro hand training in the tool processes of the fundamental industries. Indeed it cannot reach its own highest possibilities in the school unless it is building on a sound foundation of skill of hand.

We welcome Dean Russell's discussion, but we regret that he seems either to forget the essential element in manual training or, in his enthusiasm, to proceed without due discrimination to pull down the old in order to build up anew according to a slightly different style of architecture. This same attitude of mind was shown by one of the speakers at the Milwaukee meeting of the National Society for the Promotion of Industrial Education, when he said that "manual training should be uprooted" so that vocational training may take its place. He said that manual training came in response to a demand for industrial education, that it had not been taken seriously, had not been given much time, and had been a failure; therefore uproot it. He might better have said, Let us take it seriously; let us purge it; let us give it more time in the program; let us make it a sure foundation and build upon it. The essential elements in manual training are so fundamental to industrial education that if they were to be thrown aside industrial education would drop back forty years. The fact is, however, that they cannot really be thrown aside because they have found their way into all good teaching of handwork. Why discredit manual training before it has been taken seriously and given a full, fair trial? We prefer evolution to revolution.

—C. A. BENNETT.

Value of School-Made Furniture. A prominent furniture merchant has made the statement that the schools of the country are making furniture which has been estimated by furniture manufacturers as worth $17,000,000 a year. On this account the manufacturers wish to have the style changed to Elizabethan so that the boys cannot compete with them and reduce the output of their factories. Consequently they spent $50,000 last year in advertising the new style and they plan to spend $50,000 this year to the same purpose. This is a remarkable statement, yet seems to have been made in good faith by one should know the facts. We wonder if this has any connection with the statement so often made by furniture dealers that craftsman furniture is a fad and will not last long. We have heard this for ten years but craftsman furniture is still here and more in demand than ever. Is this not a sign that the teachings of the leaders of the arts and crafts movement are bearing fruit in America? And is it not also a sign that the manual training schools have been the chief means in spreading some of the principles of this movement?



MADE BY EIGHTH GRADE PUPIL,
ROCHESTER, N. Y.

ASSOCIATIONS

THE SCHOOL CRAFTS CLUB.

The School Crafts Club of New York City, which now numbers about seventy-five members, held its regular meeting at the Ethical Culture School on November 12, 1909. The program for the evening was in charge of Dr. E. B. Kent. The following theses on The Arts and Crafts in Relation to Public School Work were presented by James Hall: "1. The philosophy of the devotees of the 'Arts and Crafts' too often is reactionary, out of tune with modern conditions. Hence much of the arts and crafts work in the elementary and secondary schools deserves to be classed with the fads. 2. Educationally the arts and crafts can be justified on the following grounds: *a.* The study of typical crafts may lay the foundations of a comprehension of modern industrial processes. *b.* Working intelligently in different materials should give a comprehension of the logic of material, the basis of all reasonable fabrication. *c.* Efforts to produce beautiful things are the surest bases of art application."

The following theses on Certain Special Types of Constructive Work and Their Place in the School were maintained by A. W. Garritt and Fred P. Reagle: "1. Scientific Apparatus. The construction of science apparatus in the school workshop: *a.* Is the result of an effort to relate the manual training to the general school work; *b.* Stimulates the interest in both shopwork and science study; *c.* Supplies the best motive for community effort; *d.* Has been demonstrated to be practicable. Many pieces of science apparatus can be made in a school workshop sufficiently sensitive for elementary instruction. 2. The Mechanical Project. The mechanical project is the most important single type of work in the upper grammar grades, because: *a.* It follows the lines of the boys' greatest interests; *b.* It presents greatest fields for research and experiment outside. *c.* It cultivates the ability to think of and work in many materials; *d.* It offers the greatest opportunities for development of technic."

A spirited discussion followed each address. It was noted that while all agreed with the underlying philosophy of art education, a number were of the opinion that the work of our elementary schools should not be considered too seriously as arts and crafts work, but should rather be accepted and pursued as a phase of school work that teaches thru doing.

Opinions were about equally divided in regard to the making of scientific apparatus and the mechanical projects in conjunction with the regular shopwork. It was maintained that the shopwork offers such splendid opportunities in constructive work that we do not need to fall back upon the making of science apparatus, which either is so simple that the regular shop course model will do as well or better, or is so complex and difficult as to make the outcome very problematical. Attention was drawn to the fact that shopwork was introduced into German schools thru the making of scientific apparatus, serving thus as an entering wedge which has been discarded long ago.

As to the mechanical project it was held that it too often resulted in unfinished or poorly finished work because of the difficulties that beset the work. The opinion seemed to prevail that simple shopwork requirements were already large enough to require all the regular and spare time of a conscientious and live teacher engaged in it.

The program was followed by the usual business session. The executive committee, in the words of President E. C. MacNary, believes that "for a club to exist permanently and profitably it must work along the lines of active participation of the part of the members rather than on the plan of passive entertainment. The club aims this year to present a program at each meeting that shall include one art subject and one subject dealing with construction. Opportunity is to be given for both formal and free discussion at the close of each paper." —HERMAN BUCHER, New York City.

NATIONAL SOCIETY FOR THE PROMOTION OF INDUSTRIAL EDUCATION.

The third annual convention was held in Milwaukee, Wis., December 2-4, 1909. The various sessions were well attended and there was unmistakable evidence of a growing national interest in industrial education. As was clearly pointed out by one of the speakers, however, it seems to be taking too long to get thru the discussion stage to real action. We still hear the repetition of the assertion that "in the State of Massachusetts there are more than 25,000 children between the ages of 14 and 16." etc., etc., as if it were a newly-discovered situation. Nevertheless it was an interesting and inspiring meeting.

The exhibits of work from more than thirty trade schools were one of the most significant features of the meeting. Here was plainly to be seen evidence of substantial progress in the establishment and development of trade school courses. Professor Richards in speaking of the exhibit as a whole described it as the most significant and comprehensive yet gotten together. "These results show that intensiveness and thoroness of work need not be sacrificed by public control. Among the most interesting features of the exhibit is a series of large charts mounted on racks to swing like leaves of a book showing the work of the Correspondence School of the International Typographical Union of Chicago. It is valuable incidentally as an illustration of effective methods of display. Special credit is due the local committee, under the direction of Charles F. Perry, Milwaukee School of Trades, for efficient service in arranging and erecting the exhibits, also the acting secretary, Louis Rouillion, of New York."

The convention opened on Thursday evening with the Annual Banquet at the Hotel Pfister, at which Gov. James O. Davidson, of Wisconsin, was toastmaster. Addresses were delivered by President Van Hise, University of Wisconsin, Dr. George H. Martin, Boston, Mass., and President A. C. Humphreys, Stevens Institute, Hoboken, N. J., President of the National Society.

President Van Hise in speaking of "University Aid in Industrial Education," referred to the forces which have caused the great state schools to consider the demands for instruction on the part of all classes of citizens. He said in part:

UNIVERSITY AID IN INDUSTRIAL EDUCATION.

"The rapid advance of applied knowledge in the world, and the absence of trade schools in the United States, have made it advisable for universities to give aid in industrial education. This has been done at the University of Wisconsin and to a lesser extent at other universities, by the establishment of the extension divisions. The extension division of Wisconsin, besides giving information by lectures and by institutes, as for instance, bakers' institutes, gives systematic instruction by correspondence in many industrial lines. In this matter the correspondence schools, established upon a commercial basis, have led the way and performed a great service. The chief defects of such schools have been that each man must work by himself and that he does not come in contact with his teacher. The inevitable consequence is that comparatively few men have the stamina to continue long in study. The great majority drop out of the courses which they begin. Realizing these defects the University of Wisconsin has handled its correspondence work for artisans so that groups of men work together and meet a teacher, the traveling professor. This could only be successful by the cordial cooperation of the manufacturers. The manufacturers, and especially those in Milwaukee, have furnished class rooms in which the men may meet; not only this but they pay their men for the time they are receiving instruction, an hour once a fortnight.

"This attitude upon the part of the manufacturer is broad gaged liberality, based upon a desire to help his men to improve themselves as well as to have the services of trained men.

"The traveling professor and the class room work place study by correspondence upon a new and higher plane. Under the new conditions the great majority of students persist to the end of their courses. The work of the Wisconsin extension division has met with enthusiastic support in this State and pending the wide development of the trade school it is the best method yet devised to give industrial education.

"Even when the trade school is fully developed, as it will be in the future, the extension work for artisans will be continued. Men need a broader training than a simply vocational one. They need to go farther than the trade school. When the trade schools are able in this State to do satisfactorily the vocational work demanded, it will be the aim of the University of Wisconsin to continue to teach the artisan after he leaves the trade school, not only in advanced studies relating to his vocation, but in studies which concern his duties as a citizen, and which concern him as a man. It is our desire to open to all the way to a higher intellectual and spiritual life."

Dr. George H. Martin, formerly Secretary of the State Board of Education of Massachusetts, spoke on "State Legislation for Industrial Education." Dr. Martin said:

"Legal provision is not needed anywhere for investigation of industrial conditions or industrial educational needs. All the facts have been known for twenty-five years at least, and no more State commissions are needed to re-discover and proclaim them.

"Financial aid by the State is essential even in the wealthiest States. We may say that it ought not to be, we may argue that to teach the elements of some occupation by which a boy or girl may become self-supporting, is as necessary, as much a part of the local public burden, as to teach the three R's; but the fact remains, and we have to reckon with it.

"Industrial training will inevitably add to the cost of public education. The equipment of industrial schools is more expensive than for other kinds, the material used in handwork must be paid for, and the teachers can not be hired for the wages now paid to grade teachers in the public schools.

"Were drawing and handwork required in all elementary public schools, a foundation as broad as the public school system itself would be laid on which might be built any specific sort of industrial education. Shoe schools, textile schools, machinists' schools, agricultural schools, would all find in such preliminary work a common soil in which to root themselves.

"The problem of the industrial efficiency of the coming generation is inextricably interwoven with the problems of public playgrounds and gymnasiums, of the sanitation of houses, of the congestion of tenements, and of the hours of labor of women and children.

"While we are talking to-night about the economic value of industrial education, let us not forget that intelligent consumers are as necessary to economical success as intellligent producers, that it will be idle to train a generation of workmen who can produce fine things unless they are also trained to enjoy, and desire fine things. That refinement of taste which comes from the study of nature, literature and art is as legitimate and as essential a part of industrial education, and in the end will be found as economically profitable as the hand-training which we are now emphasizing."

DR. HUMPHREYS ON EDUCATIONAL WASTE.

President Humphreys spoke on "The Economic Value of Industrial Education." He drew an analogy between reckless waste of the country's natural resources and the improvidence and superficial character of our educational processes. In part he said:

"Of thirteen millions of young men in the United States between the ages of 21 and 35, only five per cent receive in the schools any direct preparation for their vocations; and of every one hundred graduates of our elementary schools, only eight obtained their livelihood by means of the professions and commercial pursuits, while the remaining ninety-two supported themselves and their families by their hands.

"If we are open to conviction, we need no investigation to convince us that the public school system of this country has not been developed and maintained for the benefit of the masses, but rather has been operated for the benefit of the few. We have no possible right to build up a general scheme of public primary and secondary education with the college as the goal. This is sacrificing the many for the benefit of the few; a useless sacrifice because the few can be taken care of without resorting to such wasteful methods.

"Our public schools, speaking generally, have so far placed the emphasis too markedly upon the so-called cultural studies. Personally I cannot understand how any study which is honestly followed can fail to be cultural, as far as it goes. Of late years, there has been an effort to establish the balance, as evidenced by the introduction of manual training."

Beginning on Friday morning the sessions of the convention were held in assembly rooms in the new Auditorium, the same building in which the exhibits were installed. The first speaker was Arthur D. Dean, Chief of the Division of Trades Schools, New York Department of Education. He said:

"Industrial education means the redirecting of our public schools, adapting them to the needs of our people, from an economic as well as from a social standpoint. It is in no way antagonistic to the general function of all education which is to develop and train the mind. The mind may be trained by means of many subjects, and some subjects or processes are best for one group of persons and other processes for other groups. This is a problem which has no single solution. There will be as many classifications as there are vocations, and nearly as many solutions as there are communities.

"A State policy of industrial education must be considered in the light of education in an industrial democracy—that the State is endeavoring to construct an educational philosopohy for those who work in our constructive industries. Simple and balanced justice makes it necessary to give to the wage-earning masses, and to the common industries, such equivalent as we can for what the present schools are doing for the wealthier classes and for the professional and managing vocations.

"The raising of the compulsory school age to 16 years cannot be avoided in the discussion of industrial education. All schemes of industrial education base their claims on the years wasted between the ages of 14 and 16. There is little use in proposing a form of education necessarily expensive and complicated, unless we strike at the root of the evil. Every boy and girl up to the age of at least 16 years should be engaged in a work profitable to body, mind and soul, or else in a school which we hope may be even more profitable. School laws and factory laws must work together."

Charles F. Perry, Director Milwaukee School of Trades, spoke on methods of developing trade school work for boys and described the experiment now being carried on in Milwaukee. He spoke briefly also of the new trade school for girls soon to be opened in that city.

INDUSTRIAL EDUCATION FOR GIRLS.

Mrs. Raymond Robins of the Woman's Trade Union League of Chicago, spoke on the Industrial Education of Girls. She said in part:

"The question of industrial education for young girls still causes a good deal of confusion in the public mind. The average person sees in the young girl only the potential wife and mother, for which position she ought to be qualified through training, and forgets the additional and no less undeniable fact that for an average of seven years she is a bread winner. The shortness of this period in contrast with the twenty odd years of her wifehood and motherhood, easily causes the importance of training for those seven years of bread winning to be overlooked, and, in the public mind, places the emphasis exclusively upon domestic science training.

"The demand for home training is based on the natural realization of its value to the home and the community, but it is no exaggeration to say that lack of equipment for her years of bread winning brings about results even more disastrous than does now her lack of knowledge of the domestic arts. As a member of the great unskilled and unorganized group, the young girl acts as an underbidder in the labor market, and by accepting poor wages and long hours, by lowering the standard of living, she is instrumental in causing the greatest possible attack upon the home.

"Granted that the average woman works but seven years in industry, yet is her interest in the conditions of industry a life interest, for upon her capacity in the trade and her control of the industrial conditions of that trade, depends in large measure the amount of wage upon which is to be built the homes of the nation.

"Industrial education must be given to the young girl as well as to the boy. That such education must be under the control of public school boards is a foregone conclusion to all who value democratic control of education. Nor can it be too often emphasized that one of the most important features of such industrial training must be to give to these young girls a knowledge of the value of their labor power, for to know how best to protect and sell that power is even more essential for individual and social welfare than is industrial efficiency itself."

The discussion of the trades school question, following the regular papers, was participated in by Miss Anna Hedges, Hebrew Technical School for Girls, New York; William C. Smith, Winona Technical Institute, Indianapolis, and Lewis Gustafson, Rankin School of Trades, Saint Louis. Mr. Gustafson said:

"The trade school must be practical. Its graduates must be plumbers, painters, carpenters, definitely trained trade workers. No amount of general intelligence, general education, or general knowledge will compensate for ignorance of the peculiar technicalities pertaining to a given trade; no amount of mere handiness with tools will compensate for slowness or clumsiness in its peculiar and deft operations.

"No school can teach all trades; each must choose those trades for which there is most urgent need. Each trade chosen will present its own subject matter from which there can be little or no profitable deviation. The time required to cover this subject matter will be largely determined by its nature and by the difficulties which it presents. Each trade will require as instructor a practical man or woman of successful experience in that trade.

"Who may be admitted? Obviously the answer is: Only those boys and girls who may profit to the community learn a trade and work at a trade after learning it. This in a large measure eliminates the lame, the halt, the blind, the diseased, the mentally defective, and the morally depraved. For most trades good health, energy, strength, faithfulness, and ordinary intelligence are required. Given these and proper instruction, and the results will in nine cases out of ten be gratifying.

"No false standard of education should be raised to bar out or to admit students. Many a good carpenter is illiterate; many a college graduate would make a shockingly poor carpenter. The only fair question to raise is, can the applicant profitably learn a trade and be useful in following it? No standard of graduation from grammar school or of completion of any particular grade should be allowed to determine the candidate's fitness.

"Standards of age should not be a large determining factor. Sixteen or—not sixteen, fifteen, fourteen, or eighteen, has little to do with the matter. To permit such restrictions is to confound the school with the trade, to make the school more important than the trade which it exists to teach."

CORPORATION AND EVENING TRADE SCHOOLS.

A public meeting presided over by Mr. George Carmen, Director of Lewis

Institute, Chicago, was held at 2 P. M. in the Auditorium. It was opened by Hon. Willet N. Hays, who spoke on Vocational Education and Legislation. Mr. Hays, Assistant Secretary of Agriculture, presented the need of broad gauge legislation on the subject of Industrial Training, and reviewed the features of different plans which have been developed in various States.

The discussion which followed was upon Corporation Schools as organized by different companies for the training of apprentices. It was opened by Joseph J. Eaton, Director of the Trades School of Yonkers, N. Y. Mr. Eaton described the Ludlow Textile School which was created with the definite aim of training apprentices for executive positions in the mills.

"This school is of the half-time class, that is, pupils devote half a work day or five hours to work in the mill and half a school day, or three hours to school work. Thus during eight hours of each day the pupils are in the employ or under the supervision of company officials. For this time they are paid, receiving just as much for each school hour as for each hour spent in the mills.

"In order that the mill work may not be interrupted the boys work in pairs, alternating the mill work with that of the school. This shift occurs each day. It might be interesting to note that the mill work suffers in no way by this arrangement as the boy who goes to the mill in the afternoon takes up and carries on the work commenced in the morning by his partner. As far as the mill work is concerned the apprentices become as proficient as other workers and they acquire a broader knowledge of mill work than that possessed by some of the foremen. This seems rather remarkable as the school has been established less than three years. Possibly one of the factors contributing to this is that each apprentice has been removed in great part from monotonous and machine like repetition demanded of other workers which has such a deadening effect on the motor senses.

"Under these arrangements the so-called 'difficult age' is cared for. There is a definite connection between the school work and the outside work. In the mill the apprentices are actually doing what is to be done and they have a place to go to have answered questions raised in the mill. 'Pupils bring their minds as well as their bodies to school,' as the work is real and tangible."

President John L. Shearer of the Ohio Mechanics' Institute of Cincinnati, spoke on the evening schools. He said that no claim should be made that evening instruction is the ideal method of instruction, and continued:

"Evening schools of the past, as well as the present, have been and are still engaged in patching defective primary education. They are providing limited, one might almost say superficial vocational training to meet the demands of the hour. Technical processes having multiplied so rapidly and the use of complicated appliances having become so general, it is found that the established educational system, though taxed to its utmost, cannot supply the demand for men and women who are trained to perform specific tasks. The night school is, therefore, an important adjunct and feeder, so to speak, to the many business interests of to-day."

Mr. Louis Rouillion, Director of the School Department of the Mechanics Institute, New York, continued the discussion on evening schools. He said:

"The subject demanded by a large majority of evening school students is drawing, in some one of its various branches. This subject is given but little time in the public school. Aside from the three R's, a knowledge of drawing is the first thing that is required of a young man in the majority of trades if he is to intelligently pursue his trade and advance therein.

DRAWING AN ESSENTIAL FOR THE ARTISAN..

"Drawing is the graphic language of manufacture and building, and a lack of knowledge of the drawing of one's trade is soon felt and the ambitious ones flock to the evening technical schools to obtain this knowledge. In the City of New York, numerous schools offer evening courses in free-hand, architectural and mechanical drawing. In two of these schools alone—Cooper Union and Mechanics Institute—about five thousand students are annually pursuing evening studies, the large majority taking some form of drawing. In the Y. M. C. A. courses, given throughout the United States and Canada, of a score or two of subjects offered, mechanical drawing leads all others. In New York City, where the building interests are larger than the manufacturing, the greatest demand is found for architectural drawing."

Mr. Channing R. Dooley, President of the Casino Technical Night School, Pittsburg, gave an illustrated lantern talk on "Training Non-Technical Men." He spoke of the work of the Casino Night School, and showed various lantern slides of the students at work in the different shops.

At the evening session of the National Society Dr. Charles S. Howe, President of the Case School of Applied Science, presided. The first speaker was Dr. Jesse D. Burks, of the Bureau of Municipal Research, of Philadelphia. His address was on "Results vs. Resolutions," and formed a vigorous plea for the practical development of some of the plans for industrial education now so freely discussed. He said in part:

"Of late the thought and interest of manufactures, educational leaders, and citizens alike have been focused, as they have rarely been in any other public movement, upon industrial educational and other social needs. The need of industrial education has been emphasized again and again by the United States Commissioner of Education, by many leading State and City Superintendents of Schools, by the Governors of numerous States, and by the President of the United States in at least two of his messages. It has been vigorously urged by manufacturers' associations, labor organizations, associations for civic betterment, charity organizations, and political parties. State legislatures have passed favorable laws, and periodical publications have given to the industrial education propaganda a degree of publicity and support that they have rarely accorded any similar public movement.

MORE FAITH THAN WORK THUS FAR.

"Even a cursory examination reveals the fact that the practical outcome of this interest has not been at all commensurate with the energy that has been put into the agitation. In the field of public secondary education, for example, the net result is thirty public high schools in the United States known variously as manual training schools, technical high schools, and mechanic art schools.

Most of these give from five to nine hours a week to manual, technical, and industrial instruction. Some give as little as four hours, and a few as much as twelve hours a week to such instruction.

"There can be no doubt as to the necessity and value of accurate knowledge concerning industrial conditions and educational needs. But we already have far more information of this kind than is being utilized in practice. From this time forward, the individual or the associattion that formulates a definite working plan and sees that it is carried into effect, in at least one city or one school, will perform a far more valuable service for industrial education than the individual or the organization that devotes its energy to the further consideration of a need already recognized, to theoretical programs, or to the framing of declarations and petitions. What is needed now is not more words, but more works; not more ideas, but more experiment; not more conferences, but more industrial schools; not more publications, but more boys and girls with adequate equipment for industrial pursuits."

WOMAN'S PLEA FOR REFORM.

Mrs. Anna Garlin Spencer of the Society for Ethical Culture, spoke on "What Can the American Graded School Do for Industrial Education?" She defined the present trend of education and said:

"The movement for industrial education should not ask how it can most easily and economically 'slip into' the existing school system; its business is to aid substantially in demanding a radical readjustment of obsolete ideals and methods in the people's schools. The movement for industrial education should not fix its attention solely or chiefly upon the needs of the children of the poorest families who must get 'their working papers' at the earliest moment allowed by law; it should stand intelligently and supremely for a reorganization of education in general for all children in order to fit them for a new industrial order. The movement for industrial education should not emphasize the class need of the manufacturer for better workmen, or that other class need of the wage earner to secure more effective training for manual occupations; it should relate these class needs strictly and persistently to the social need for race developmnet in health, and work—efficiency, all around the circle of human effort.

"Before the age of eight, at least, no child should be forced to sit in a school seat, before a school desk, or be held to any form of school life which forbids or checks that constant activity which nature demands for the child's good. From 8 to 12 there may be, without harm to the body or mind, a gradual methodizing of activity in accordance with the demands of regular instruction. But we have made millions of stupid grown people out of millions of 'bright children' by the usual treatment of 'primary school pupils.' It is time this were stopped.

"Let us shield the children of 12 years and under, from all thought of forms of manual work or vocational training, other than those which are related to the out-of-doors and to the personal and home needs. But these will include all those forms of manual training which make a 'handy man about the place,' and 'a handy woman about the house,' and an adaptable creature of either sex who can mend and make and save in case of need. This all-around manual training is absolutely required to check the deterioration of the common intelligence thru too early and too sharp specialization of work."

INDUSTRIAL EDUCATION IN GERMANY.

Prof. Ernest C. Meyer, of the Department of Political Science, University of Wisconsin, spoke on Germany's work in the field of Trade Teaching. He said in part:

"One of the most striking contrasts between the development of the industrial education in this country and in Germany, is found in the fact that whereas in Germany the great system of industrial schools from the lowest to the highest is part of the flesh and blood of the general educational system, we can in this country hardly speak of such a system at all, and are only to-day taking the first step toward a co-ordination of such schools as we have to the system of general education.

"In Germany industrial schools are accorded universal approbation and enjoy the enthusiastic support of the government, both state and city, of trade organizations, and of individuals, to the extent of many millions of marks annually. With us the idea of trade schools is in many quarters still ridiculed as akin to that of the dress-suit mechanic. We are only opening our eyes. Germany has already grown powerful in conquest.

"Originally designed to develop in the student manual dexterity and skill in execution, the technical schools have developed into institutions wherein is fostered, primarily, an earnest pursuit of science for science's sake. From the training of skilful artisans the schools have turned to the training of skilful scientists—skilful, because they learned how to carry science into industry, how to transmute theory into practice. Herein lies the secret of their greatness. In these laboratories are made the great discoveries which are revolutionizing methods of manufacture, cheapening the process of production, and forcing German commodities into new markets in all quarters of the globe."

At the Saturday morning session papers were read by Charles R. Allen, New Bedford, Mass., Supt. W. H. Elson, Cleveland, and Edgar S. Barney, New York, on "Intermediate Industrial Schools." The discussion was closed by Supt. L. D. Harvey, Menomonie, and Charles S. Pickett, New York. Supt. Harvey took occasion to rap certain extreme statements that had been made by previous speakers in the effort to prove their contentions, and Mr. Pickett spoke somewhat in detail of the Public Vocational School for Boys in New York, of which he is director. He said in part:

"This Vocational School is not a trade school, as the term is ordinarily understood. We do not aim to turn out journeymen mechanics. Our boys are admitted upon graduation from the elementary schools, or, if they have not graduated, and are fourteen years of age, they are admitted provided they pass an examination conducted by the Principal of the Vocational School, in reading, writing, common and decimal fractions, weights and measures.

"Upon admission, the boys are placed upon probation for five months, during which time their fitness for the work can be determined. A boy may be dropped, however, at any time if circumstances warrant such a proceeding.

"Upon the completion of the prescribed work of two years, the successful graduate is to be given a diploma which will be of such a nature as to make the proud possessor thereof feel that he is indeed fortunate, because it will represent 'Something attempted, something done.'

"The school day is seven hours long, from nine to five, with an hour for lunch. Sessions are held five days a week, exclusive of Saturday, for eleven months in the year. The holidays are the same as in the other schools. The object of this arrangement is to introduce the pupils to some of the actual business conditions, while not making the transition too sudden, nor too violent.

"The teachers are of two classes: those who teach the vocational subjects, and those who teach the non-vocational subjects. The former are to be men who have had the practical experience of mechanics, men who know their subjects from an intimate acquaintance with labor. They must be men who have the power to inspire a boy; men whose personality is such, that a mere acquaintance with them will do more to create a feeling of respect for the dignity of labor, than would all the preachments that might be indulged in. I have unbounded respect for the large majority of progressive American mechanics, and I feel it is our bounden duty to let these men know that we do respect them.

"The teachers of the non-vocational subjects are men who are specialists in their various lines and who know something of the practical side as well.

"You will remember that this is not a school to make journeymen. Boys are admited at fourteen years. Now, the fourteen-year-old boy scarcely ever knows just what vocation he ought to follow, therefore our younger boys will be permitted to take what might be called a general course, including several lines of work. After a short time, when he has 'found himself,' the boy will emphasize the work of his choice, and drop the others. Those boys who have definite ideas concerning their vocational work will immediately commence that work, and prosecute it intensively in an environment and an 'atmosphere' approximating practical shop conditions as closely as is possible within the limitations of a school. Provision has also been made for co-operative arrangements between outside shops and the school, provided such arrangements be found desirable.

"In addition, pupils will be given instruction in mechanical and architectural drawing, free-hand drawing as related to the trades, and industrial design. This course will include the making and reading of plans, the preparation of specifications, and making of blue-prints.

"We shall also provide for a broad vocational foundation by giving the boys some instruction in elementary bookkeeping, not to make bookkeepers of them, but simply to place them in a position to intelligently transact their own business. For the same reason, they will be made acquainted with the basic fundamentals of commercial law so that they will be prepared as old Polonius would, in a broad paraphrase, have his son prepared, 'To beware of entrance to a legal quarrel; but being in, see to it that the enemy 'bewares' of thee.' I think we are all agreed that it is a good thing for the workingman to know the nature of a business obligation, a contract, and what it implies. Such knowledge would perhaps remove one bone of contention between employer and employee.

The concluding session, for the transaction of business, was held on Saturday afternoon, at which time the reports of officers and committees were received.

The Report of the Committee of Ten was read by the acting secretary, Louis

Rouillion. This was in the nature of a supplemental report, the first section having been presented at the Atlanta meeting last year. One important part of the report recommended definitions of industrial education, manual training, vocational, and other terms now much in use in these discussion.

The report also recommended the adoption of resolutions placing in the hands of the President of the Unitd States, the Commissioner of Education and other high government officials the two reports of the Committee of Ten, that the high importance of industrial education to the nation and its economic welfare be pointed out to those officials, and that the Society urge upon them the duty of an adequate study of this subject by the national department of education, and earnestly recommend to the President and other officials the wisdom of an adequate appropriation for such a study by the Department of Education, the Commissioner being asked to submit an estimate of the amount necessary for such a study. The report is to be published in full and furnished to all members of the Society.

The officers elected for the ensuing year are: President, Charles R. Richards, Director of Cooper Union, New York; Vice-President, Theodore Robinson, Illinois Steel Co., Chicago; Treasurer, Frederick B. Pratt, Pratt Institute, Brooklyn, N. Y. The Secretary is appointed by the Board of Managers.

Rochester, N. Y.; Indianapolis, St. Louis, Buffalo, Toledo, Pittsburg, and Cincinnati were applicants for the fourth annual convention, with Rochester undoubtedly in the lead, but the choice was left to the Board of Managers.

NATIONAL EDUCATION ASSOCIATION.

The advance proof of the program of the Department of Superintendence has been received and promises a strong meeting. The date is March 1-4, 1910, at Indianapolis. Of special interest to workers in the field of the manual arts will be the Round Table of Superintendents of Larger Cities, Mrs. Ella Flagg Young, Chicago, leader. The general topic is "History and Art as Requisites in Making the Curriculum for Industrial Education;" *a.* "The Lesson of History," by James H. Robinson, Columbia University, N. Y.; discussion led by Supt. W. H. Maxwell, New York; *b.* "The Study of Art as a Requisite in Industrial Education," by Walter Sargent, University of Chicago; discussion led by Supt. Ben. Blewett, St. Louis.

The program also includes an address on Tuesday evening by Hon. Albert J. Beveridge. One of the topics in the Round Table of State and County Superintendents is: "Industrial Education in the (a) Consolidated School; kind and scope; (b) One-room School; kind and scope." On Thursday morning the topic "Effect of Industrial Environment of City Life on Educational Policy," is to be discussed by Arthur D. Dean, Division of Trades Schools, New York State Department of Education, followed by C. B. Connelley, Carnegie Technical Schools, Pittsburg, and John F. Haines, Noblesville, Ind.

On Thursday afternoon under the general theme "Children Differ in Vocational Aim," the following papers are announced: "Industrial Education in Elementary Schools," by Ben W. Johnson, Seattle, Wash.; "Trades Schools and Trades Unions," by a speaker to be selected; "Vocational Courses in Secondary Schools," by W. F. Webster, Minneapolis. The National Committee on Agricultural Education is to discuss, among other topics, the question, "How Can this National Organization Assist the Various States in Securing Needed Legislation along Lines of Agriculture and Other Forms of Industrial Education?" On Friday morning there will be an address by Dr. Woods Hutchinson on "Which is Man's Life—His Work or His Play?"

All active members and others in attendance upon the Indianapolis meeting are especially urged to co-operate in securing the necessary one thousand holders of railroad "certificates" showing regular full fare paid of one dollar or over. The deposit and proper validation, at twenty-five cents each, of one thousand such certificates will enable each holder to purchase return ticket at one-half fare. Full information as to railroad arrangements, hotels, and copy of program may be had upon application to Secretary Shepard, Winona, Minn.

The executive committee, at time of going to press, is not yet prepared to announce the place of meeting for the July Convention. The choice lies between San Francisco and Boston and the decision will be made public just as soon as railroad rates can be determined.

WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

The December Bulletin announces the date of the meeting at Minneapolis, May 10 to 13, 1910, and gives directions for those planning to send exhibits. A special effort is to be made to secure for the Minneapolis meeting exhibits in which each city will undertake to illustrate some phase of the work that has been specially well developed in that place, rather than general exhibits in which not many mounts on any one subject can be shown. Subjects suggested by the committee are: design, handwork, landscape, etc., or new lines of work. It is hoped that the value of the exhibits for study will be greatly increased by some such plan of concentration.

IOWA MANUAL ARTS ASSOCIATION.

The second annual meeting of the Iowa Manual Arts Association was held at Des Moines, November 19 and 20, 1909, and an enthusiastic meeting is reported. The program began with a banquet on Friday evening at the Wellington Hotel. After the addresses of welcome the President's Address was delivered by Charles H. Bailey, State Teachers College, Cedar Falls, and Dr. Florence Richardson, Drake University, spoke on "The Psychology of Motor Processes."

At the Saturday morning session there were reports of two committees· "Course of Study," by M. Graham, Davenport, chairman, and "Drawings and Tracings," by R. C. Kelley, Sioux City, chairman. Then followed an address, illustrated by stereopticon views, on "Manual Training in Europe," by Charles A. Bennett, and a paper on "Wood Finishing," by Miss Sadie B. Warner, Cedar Rapids.

CALIFORNIA MANUAL ARTS.

The California Teachers Association of Manual Arts held its meeting on Saturday, October 30, 1909, at Leland Stanford University, Palo Alto. Professor Cubberly gave an interesting talk on "Technical Instruction in the Schools," in which he emphasized the value of household economics in the elementary schools, and spent some time in pointing out the extent to which the happiness of the home and, in fact, the whole social order of the country is dependent upon the efficiency of the housewife and mother. He insisted that not only should household economics be offered in city schools but also, to some extent at least, in all schools large and small.

Professor Rolfe, in his address "The Education of Tomorrow," took the stand that teachers as a body can be quite definitely divided into two chief classes: the investigators, and the educators; and he attempted to show that too frequently teachers, instead of being merely educators, try to take the place of investigators also, thereby in reality becoming neither. His point of view aroused quite a little discussion, and it seems as if this question might well be discussed further. —CHARLES JACOBS, San Jose, Calif.

SCHOOL ARTS AND HOME ECONOMICS ASSOCIATION.

The Wisconsin School Arts and Home Economics Association was organized in November at Milwaukee. Its membership includes teachers of drawing, domestic science and manual training in the State of Wisconsin. Two regular meetings are to be held each year, one at Milwaukee in connection with the Wisconsin Teachers' Association, and the other at some place to be selected by the Association. The spring meeting in 1910 will be held at Madison. The officers elected at the November meeting are: President, W. F. Faulkes, Appleton; Vice-President, Mrs. Bertha Johnson, Oshkosh; Secretary-Treasurer, Newton VanDalsen, Neenah. An executive committee is provided for consisting of three members, each holding office for three years, one member being elected each year. Miss Lucy D. Hale, Milwaukee, was elected for one year; J. D. Phillips, University of Wisconsin, Madison, two years, and Miss Babcock, Racine, three years. The Association has at present about one hundred members.

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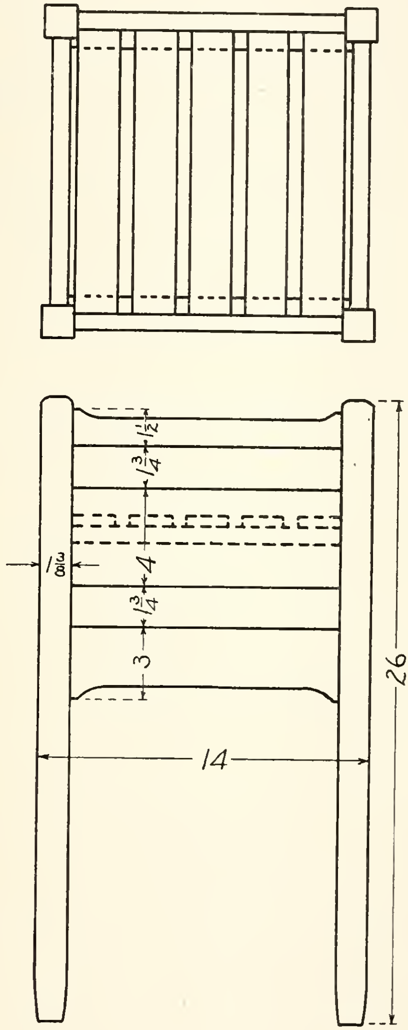
At the Illinois State Teachers' Association, Springfield, December 28-30, 1909, one session was devoted to Manual Training. A paper on "The Relation of Motor to Mental Activity," was read by D. Walter Potts, East St. Louis; and on "The Educational Value of Manual Training," by President David Felmley, State Normal University, Normal. Fred D. Crawshaw, University of Illinois, presented a carefully thought-out "Plan for the Introduction and Maintenance of Manual Training in the Schools."

At the Normal School Council on Tuesday afternoon Frederick G. Bonser, State Normal School, Macomb, presented a most interesting and valuable contribution on "What Should Be the Attitude of the Normal School Toward Industrial Education?" His paper was divided into three parts: 1. Meaning of the Term Industrial Education. 2. The Claims for Industrial Education. 3. The Attitude of the Normal School. The last part of the paper presented the following theses: "In its function of constructive leadership, the Normal School should attack the problem of readjustment of elementary school work in relation to industrial education by: *a*. Developing courses of study incorporating the appropriate subject matter of industrial education; *b*. Trying out or testing such courses of study thru their training schools; *c*. Preparing teachers to carry the best results of such readjustment into the field at large."

PLANT STAND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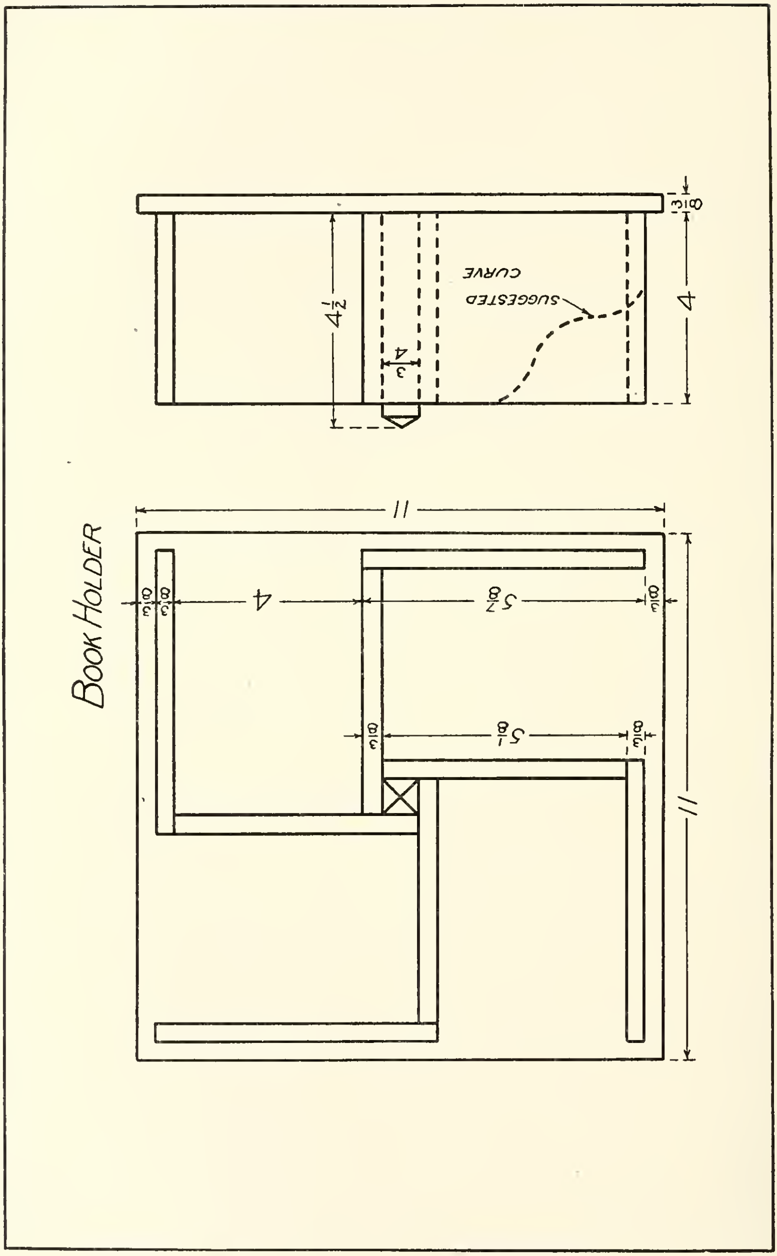

BOOK HOLDER

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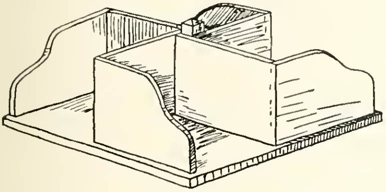
SHOP PROBLEMS.

GEORGE A. SEATON, Editor.

BOOK HOLDER.

An attractive book holder planned upon such lines that it can be successfully undertaken by beginners at the bench, is shown in the drawing of W. E. Roberts of Cleveland. By some it is termed a revolving book-rack while its plan erts of Cleveland. By some it is termed a revolving book-rack, while its plan view makes quite appropriate the term "swastika" book-rack. The drawings show the holder with all corners finished square. This gives an effect rather too severe to be pleasing and it will be better to add a slight curve to the extreme corner of the four outside strips. Just a suggestion of what might be done is indicated by the dotted line in the drawing.



PLANT STAND.

An exceedingly useful plant stand that serves as an excellent application of the mortise and tenon joint has been worked out by W. E. Roberts of Cleveland. The drawing is so clear that further explanation is hardly needed.

LIBRARY LAMP.

A problem that is rather difficult, but which always pleases the boys when worked to its completion is some form of library lamp. The easiest methods of illumination are by electricity or gas and most of the problems undertaken in manual training schools have been for one of these illuminants. The drawing submitted by Hans Schmidt, of St. Paul, gives the problem of the lamp alone.

PIANO BENCH.

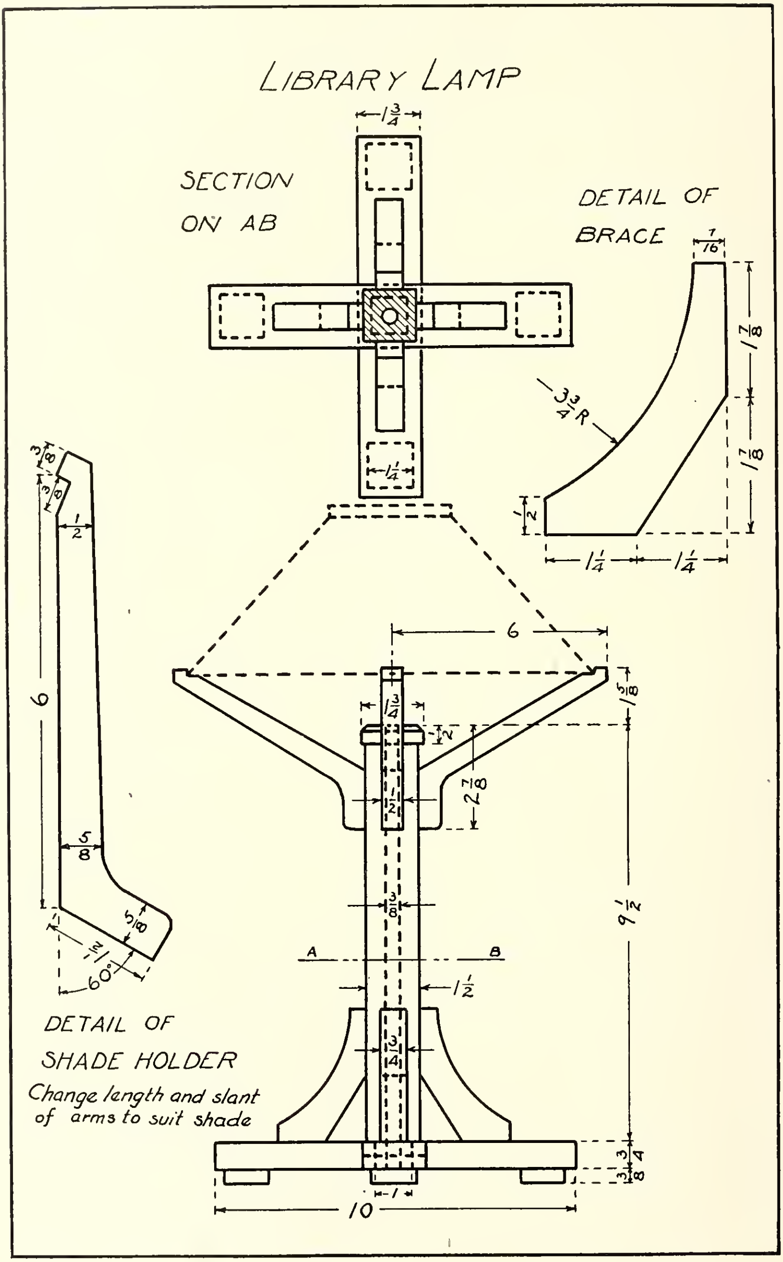
One of the larger models that can be undertaken in the shop is the piano bench. The one shown is from the drawings of C. W. Avery of the Detroit University School.

COLLAR AND BUTTON BOX.

Chas. F. Kahle of Deadwood, South Dakota, and E. D. Lemmerman of South High School, Cleveland, have submitted ideas quite similar, for the construction of a combined collar and collar-button box. The drawing given is a modification of the two designs. Mr. Kahle says that the boxes are generally made of a single piece of redwood, finished with orange shellac over the filler. In the course of a few months the box ages to a beautiful dark red.

BRASS WORK MALLET.

The piercing of the background of thin brass candleshades does not require an elaborate outfit. A nail properly filed and a hammer will produce effects as good as a much better outfit. Yet if much work is to be done, it will be found that the hammer grows heavy, and the lighter wood mallet shown in the drawings will prove a welcome relief. Moreover, it will furnish the student of the lathe a good problem for mandrel turning. The same design, with all measurements increased, will make an excellent mallet for use with the woodcarving tools.



LIBRARY LAMP

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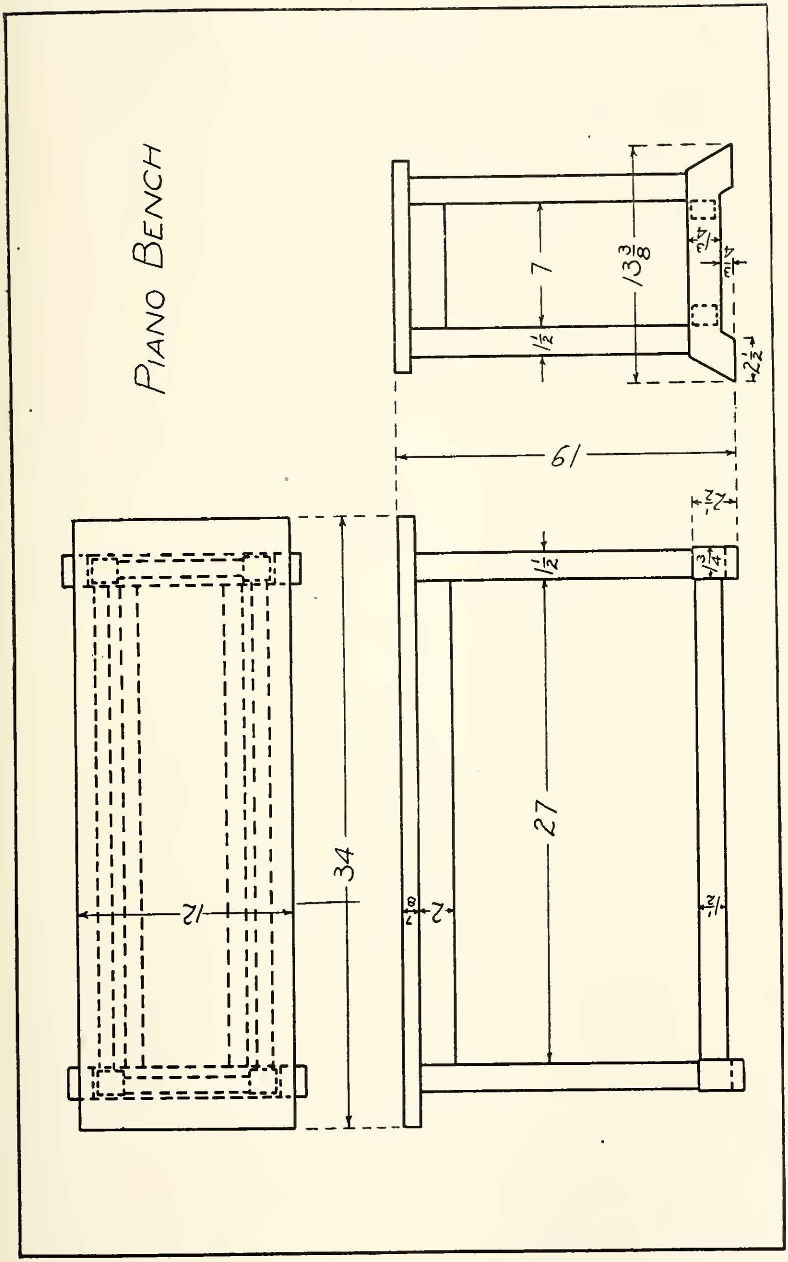
Change length and slant of arms to suit shade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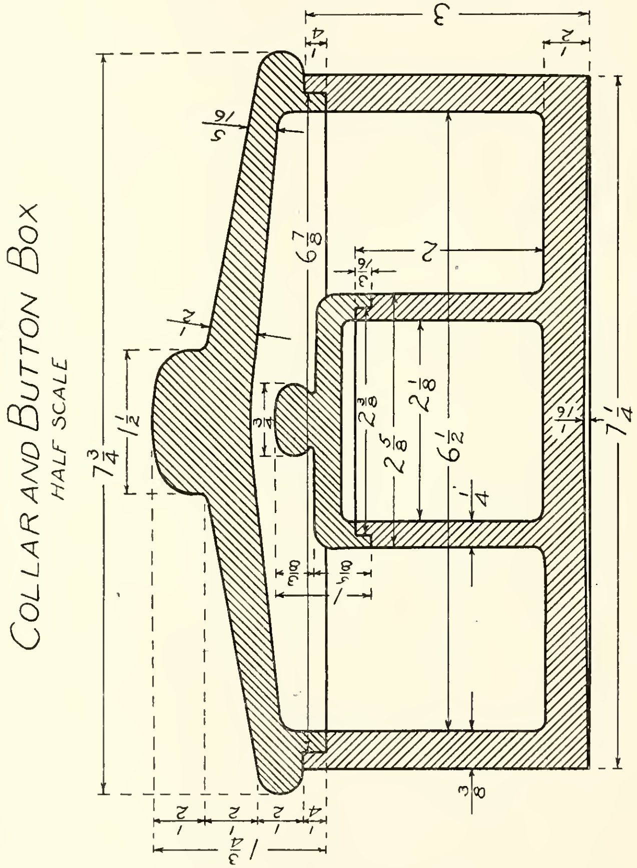
COLLAR AND BUTTON BOX
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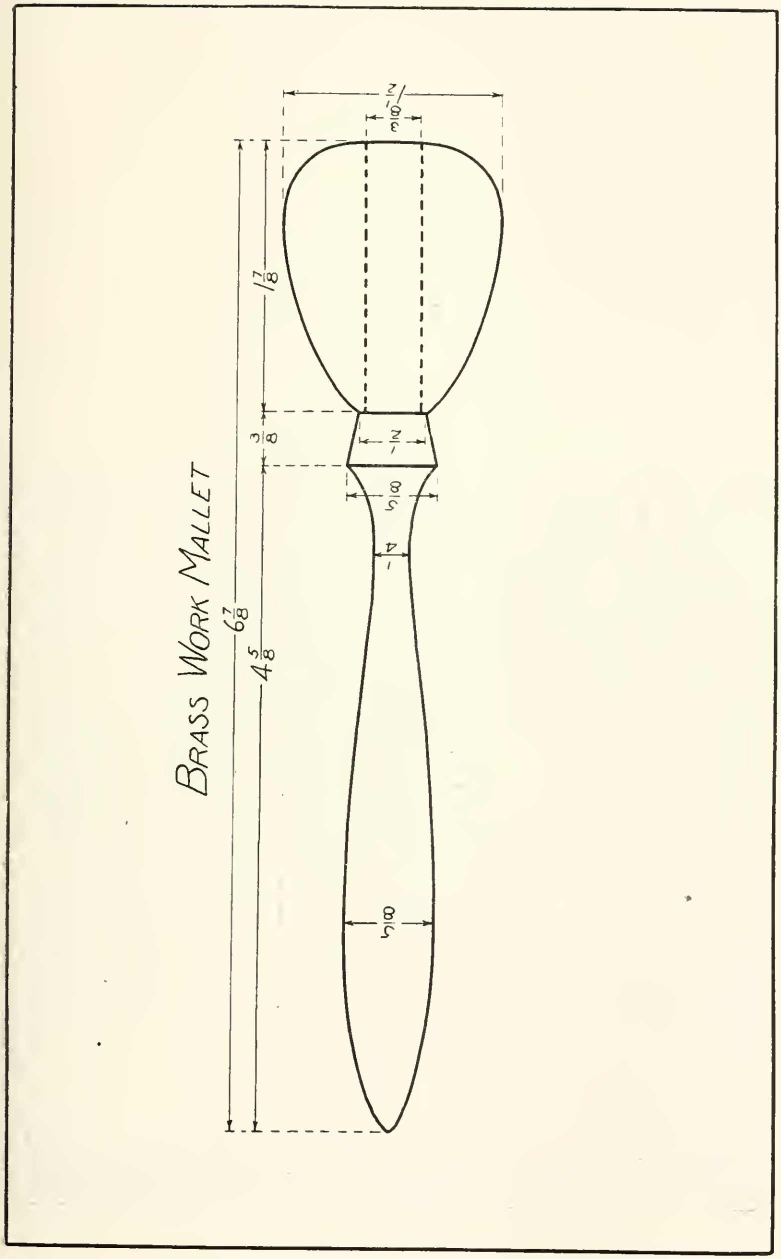
Brass Work Mallet
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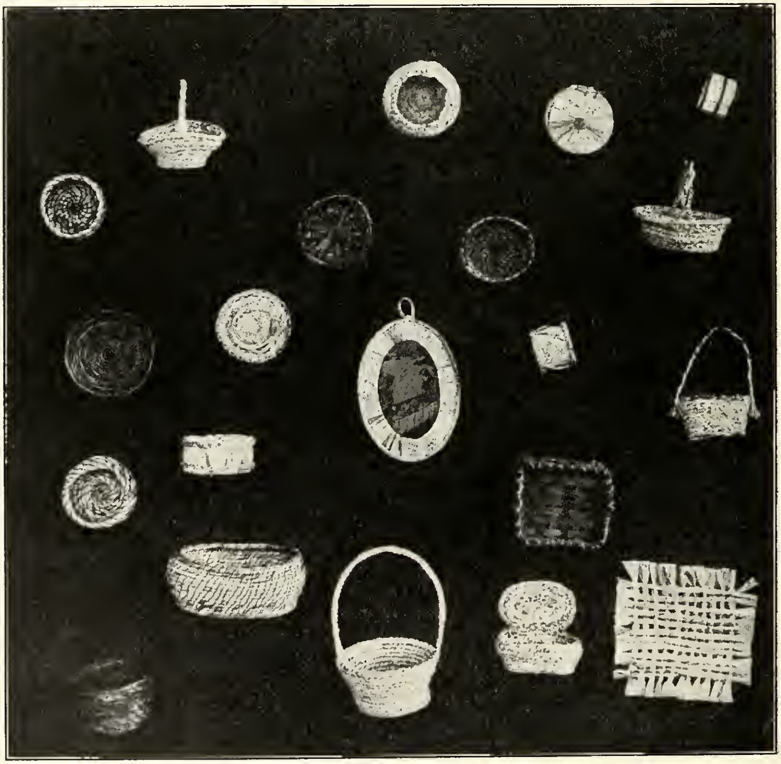
CURRENT ITEMS.

Clinton S. Van Deusen, Editor.

NATIVE MATERIAL FOR HANDWORK IN COUNTRY SCHOOLS.

Lack of competent teachers and lack of money are two obstacles in the way of manual training for country schools. Training will supply the first lack, but the poor are to be always with us. If we have no money what can we do without it? The problem as a whole will be slow in solving.

The work shown in the accompanying photograph is only an attempt at a small part of the solution. It has not been an effort to construct original or complicated models, but to take some of the familiar models in raffia work and reproduce them in material which is found on your own ground—or your



FROM STATE NORMAL SCHOOL, MILLERSVILLE, PA.

neighbor's. Some sections of the country have such an abundance of material that they need only the inclination to use it, but New England and the Middle States are poor in this respect. Even here corn husks, marsh grass and rushes are to be had for the gathering.

Of the three, corn husks are the most adaptable and satisfactory. Those obtained in the fall after the corn has been shucked are in the best condition for use. If they are sorted, cleaned from silk, and tied in small bundles, they can be stored until needed and then soaked in the bundle, for they must be wet before being used, and are at their best when slightly damp.

Color. Good: white thru buff to brown and even black where mildew has streaked the husk. There are tints of pink and green in some of the finer pieces.

Fiber. Tough, pliable, and fairly long. It can be torn in strips of any width which taper to a point and so are readily spliced.

Adaptability. It can be used like raffia for coiled baskets, wrapping and braiding. The fiber is too short and not tough enough for sewed baskets.

Marsh, or any long, wiry grass, is another possibility. Unless used as soon as gathered it has, like the corn husks, to be soaked and then used before it is quite dry.

Color. Browns and greens which vary with the season of gathering and manner of drying.

Fiber. Longer than corn husks, but more brittle.

Adaptability. Makes good coiled baskets which are very similar in appearance to those of pine needles. Some varieties can be braided but the braid is difficult to sew well.

Two of the baskets shown are of rushes, but these are not satisfactory as they must be woven when wet and in drying become too brittle and frail to handle.

Rye straw is good but not always obtainable.

These are only some of the uses of the most ordinary materials—materials which are so abundant as to force themselves on your attention if you are looking for possibilities, but so common as to escape notice if you are content with what you have. —IRIS G. PROUTY, State Normal School, Millersville, Pa.

NORTH ATLANTIC STATES.

An industrial course has been established by S. D. Warren & Co. in the Westbrook High School at Westbrook, Me. Its aim is to meet the needs of boys finishing the grammar school course, to whom a college course is impracticable, with a view to considering the capacity and inclination of the boys in their choice of a life work. It is a two-years course and is strong in applied mathematics, science, mechanical drawing, and shop work. Some time is also devoted to the study of the manufacturing of textiles and paper.

A manual training department has been opened in the new Phillipsburg (N. J.) High School which has just been completed. The work for the present will consist of benchwork and turning from the seventh grade up. J. J. Berilla, formerly supervisor of manual training at Vineland, N. J., is in charge of the department. The vacancy at Vineland is filled by George Hamilton of Philadelphia.

A recent item in this department stated that George Morris came to Syracuse as supervisor of manual training. It should have read that he came to a position in the Technical High School, as E. E. MacCready is supervisor.

MASSACHUSETTS.

Dr. David S. Snedden of Teachers College has been appointed by the Massachusetts Board of Education as Commissioner of Education for the State.

Boston is launching out into what may be termed industrial schools and industrial classes as follows: Pre-Apprentice School of Printing and Bookbinding, Old East Boston High School, pupils fourteen years or over or who have graduated from the grammar school, Miss Mary I. Donlan, instructor; Industrial School for Woodworking and Sheet Metal Working, proposed for the Old Dearborn School, similar to the Printing and Bookbinding School, both of these to be operated under the authority of the Massachusetts Board of Education; Agassiz School Industrial Class in the Eliot School, Jamaica Plain, Miss Celia B. Hallstrom, instructor, work in cardboard and wood; Industrial class in the Glenway Street School, Dorchester, Miss Florence P. Donelson, instructor, work in wood; Quincy School Industrial Class, James C. Clark, instructor, work in rough and heavy metal; Washington Allston School Industrial Class, Miss Sarah M. Aldrich, instructor, work in wood; Industrial Class, Charleston High School, Philip Goodrich, instructor, work in making electrical apparatus; Industrial Class, East Boston High School, Augustus F. Rose, instructor, work in silversmithing and jewelry.

In all of these schools and classes the intention is that the work shall be of a commercial character and the product be used by the School Committee and the Schoolhouse Commission.

The co-operative industrial course that was started in the Fitchburg (Mass.) High School a year ago last fall, and was reported at some length in this department, has been extended this year and three years of the four year course is in operation with about sixty boys enrolled. The first year work is entirely school work and during the other three years the boys are employed in pairs in the shops of the city, each boy of a pair working and attending school alternate weeks. By this arrangement the employer has the continuous service of a boy. This course was made possible by the co-operation of the manufacturers and the school authorities and these and the boys seem to be well satisfied with the results of the first year's work.

Newton, Mass., has made a beginning of an evening trade school by opening a class in mechanical drawing at the Technical High School. Sixty-nine men registered the first night.

The New Bedford Industrial School was opened last September with seventy boys enrolled and in the evening session, which opened in December, there are one hundred and seventy-five men and fifty women. A four years course is planned.

The work of the first year is as follows: The school work is divided into forty periods and the figures following the name of each study show how many of these periods are given to that subject each week: Mathematics, 4; English, 4; shopwork, wood, 10; drawing, 6; physical science, 6; shopwork, metal, 10.

The work of the second year is the same except that industrial history, 3, and civics, 3, are substituted for physical science, 6. All pupils take the same work during the first two years and may select one of six courses for the last two years. The nature of the courses is indicated by the following names: 1. Applied science (steam and electricity). 2. Metal working. 3. Automobile. 4. Machine drafting. 5. Woodworking. 6. Drafting for wood construction. Chas. R. Allen is director of the school.

SOUTH CENTRAL STATES.

About one thousand dollars has been expended during the past year for new woodworking machinery for the mechanical department of Southern University and Agricultural and Mechanical College of New Orleans, La. This institution has been doing pioneer work in the industrial training of the colored youth of the state. Instruction is given in agriculture, sewing, millinery, printing, woodwork, tinsmithing and mechanical drawing. The equipment provided for each of the last three branches is sufficient to accommodate classes of sixteen students. The courses are very practical in their aim and about one-fourth of the student's time is taken up in this training. The shop and drafting room classes are under the supervision of Frederick F. Simms.

Pine Bluff, Ark., has recently started manual training with A. B. Moore in charge. The work is given in the 7A grade and the four years of high school.

NORTH CENTRAL STATES.

During the past summer the School Board of Milwaukee extended the responsibilities of Charles F. Perry from Director of the Milwaukee School of Trades, to the position of Supervisor of Industrial Education, with entire charge of all the manual training in the public schools, including also the supervision of the trade schools for boys and girls. The new trade school for girls opened its doors for students on December 1st. The first trades to be taught are dressmaking and millinery. In connection with these trades each girl is expected to receive instruction in the applied art and design applicable to her chosen vocation, domestic science and economy, academic work and physical culture. Miss Helen Donovan, associate professor of domestic economy, for several years at the Iowa State University, has been made vice-principal of the school.

The David Ranken, Jr., School of Mechanical Trades of St. Louis opened for day classes on September 7th and for night classes on January 3d. For the first year at least the work in the day classes is to be limited to four trades: carpentry, brick-laying, plumbing and painting, but in the evening classes other lines of work are taken up as there seems to be a demand for them. The greater part of the course in each trade is devoted to the practical handling of the tools of the trade under the eye of the instructor. The remaining part of the course is given to lectures and class work in mathematics, drawing, applied science, and building construction. Wherever possible, this supplementary instruction is imparted in the shop by the instructor in his explanation of the shopwork.

The evening classes are designed to meet the requirements of journeymen, apprentices and others employed during the day. Particular attention is paid to the individual student, and such work is assigned him as will best fit his needs. In general only boys of sixteen or over are admitted to the classes and they attend from 8 A. M. to 5 P. M. on five days in each week and from 8 to 12 on Saturdays. The school year extends from September to August. The night classes meet from 7:30 to 9:30 on two nights each week for elementary classes and two nights for advanced classes.

Miss Ella V. Dobbs, formerly at Throop Polytechnic, but for the last two years at Teachers College, is at the University of Missouri this year where she has charge of the hand work for primary grades and also gives a course in design.

Manual training has recently been started in Mattoon, Ill. About one hundred boys are receiving instruction with R. C. Keople of the High School in charge.

OHIO.

The new Elementary Industrial School for pupils of 6th and 7th grades of Cleveland is proving fully as successful as anticipated. One hundred and forty-five pupils are in attendance, five-eighths of whom are boys. These pupils were sent to the school as delegates from all parts of the city and represent only a small proportion of those who would probably desire to enter the school. The school day is divided into nine forty-five minute periods, one period at noon being devoted to lunch and recreation. Three periods each day are devoted to academic work in mathematics, English and geography-history and one period to study. The remaining four periods are given to a variety of hand occupations which have one or more practical possibilities for specialization for individual pupils as the work develops in later years. Gymnasium work and music are included in the course.

Conneaut, Ohio, has dedicated a new $100,000 high school building with courses in domestic science and manual training. The course in manual training extends thru the first two years of the high school course. In the first year elementary woodwork and simple cabinet work are taught; in the second cabinet making, pattern-making, and wood-turning. Mechanical drawing is taught thruout the course. As this is the first year, the boys are all doing the same work. The work is meeting the hearty approval of the town people as Conneaut is an industrial city and it is felt that this work will fill a long felt need for this kind of training. J. C. Reynolds has charge of the work.

The Columbus Trades School was opened November 1st. Pupils entering must meet the following requirements: 1. No boy who has not reached the age of fourteen will be admitted. 2. Of boys who have the age qualification, there may be admitted: (a) Those who have finished the sixth grade; (b) those having a good deportment record in school, but who have been unable for health or other reasons to master the requirements of an English education, and who are especially recommended for the Trades School by teacher, principal and superintendent. 3. Of those who may be qualified as above mentioned, there will be admitted as many as can be conveniently cared for, to be selected as follows: preference being given: (a) To the older boys; (b) to the boys who need to learn a trade as soon as possible on account of poverty, death, or inability of parents to keep them in school; (c) to the boys who do not have a cultural bent. 4. The director is to keep a waiting list and notify applicants when there is an opening.

The school building selected for this purpose was the one most centrally located, and contains eighteen rooms. The capacity of the school will be three hundred and fifty pupils; at the present time one hundred and five are registered. Each class is limited to fifteen pupils. About thirty thousand dollars have been expended to equip the school. The two trades now being taught are printing and wood working, the latter comprising joinery, cabinet making, pattern-making, wood-turning, mill work, and mechanical drawing. One pleasing phase of the print shop is the fact that blank forms for school reports, school papers, and general blanks such as the Board of Education use in transacting business, will be printed by the boys in this department. The wood working department will turn out the school desks, book cases, cabinets, and many other articles used for school purposes. In a short time an electrical department and a machine shop department will be added to those already in operation. An up-to-date storage room and kiln dry room are also part of the school's equipment. All the lumber used in the manual training department is prepared in the mill room by the boys of the trade school.

The directorship of this school has been placed in the hands of H. W. Lowell, the present director of manual training.

CINCINNATI CONTINUATION SCHOOL.

The Board of Education of Cincinnati entered upon a new era when it recently voted for the establishment of the first continuation school in America. Realizing that the present public school system makes no provisions for furthering the education of the great majority of our youths who leave school at the age of fourteen, Superintendent of Schools F. B. Dyer, and Supervisor of Manual Training F. H. Ball have been busy for several years trying to work out a solution for this problem. It is the belief of these two men, as well as the manufacturers, that the industrial intelligence of the workmen is more and more demanded as an economic factor in the shops. It ought to be recognized as such and given due consideration for intelligent shop management.

The efficiency of the workmen, growing out of special training, is fundamentally necessary to industrial prosperity. The time is here when the manufacturers find themselves in a pitched battle of competition among themselves as well as with the foreign manufacturers.

It is to the advantage of the manufacturers all over the land to use every effort to promote the development of industrial education which means efficiency of the workman, so as to maintain our supremacy as a manufacturing nation.

There are certain tendencies which seem inevitable. One of these is the tendency toward a shorter working day. The higher efficiency of labor thru special training is the only logical offset to this tendency, otherwise costs will increase and it will be impossible to compete with other nations.

It has frequently been made evident by statistics that the average daily attendance of all boys in the public schools of Ohio is only five years. Industrial education in its various forms in the United States is very little as compared with Germany. This grows out of the fact that industrial education is not popularized in the United States. It is confined largely on the one hand to the technical colleges, leading to the production of the theoretically trained engineer, who must get the major part of his practice after he has learned his theory; and on the other hand, it has been left largely to the apprentice system in the shop, where the foreman, whose chief concern is production, does not take the time to develop the innate powers of the apprentice.

Fortunately, however, there is now a new impetus and interest in industrial education in America. Attention has been called to the modern development of the trades school idea, which does not leave the school under the direction of the school man alone, but under the immediate direction of the manufacturer, thus creating commercial conditions in the school. It is to be run as a self-sustaining institution in which work shall be produced at competitive prices, so that the student shall be brought at once into contact with the practical problems of production at low cost.

The co-operative course as already successfully established in Cincinnati, between the university and the shops, is rapidly spreading to other cities. This is the newest plan for the broader education of mechanics. A report from the various Cincinnati manufacturers indicates clearly the efficiency of the apprentices enrolled under this plan.

After giving the subject careful thought and attention, the following plan has been put into effect: classes have been established in charge of practical instructors, who are capable of teaching subjects especially adapted to apprentices, such as shop mathematics and applied science. The Board of Education pays the salaries of instructors, while the manufacturers furnish the boys. The apprentices are divided into six groups, each of which attends school one-half day each week. There is no law compelling the boys to attend these schools. The manufacturers agreed to pay the apprentices regular wages during the period of instruction. If they do not attend, their wages are withheld, so that the education is in a way compulsory. At present there are about 225 boys enrolled, with many more on the waiting list.

It is the belief of these men, locally interested, that the future development of our industrial interests upon which the growth of our city is so largely dependent, will be materially advanced. The slight cost of operating these classes will be more than compensated by the resulting growth of our manufacturing interests, which will inevitably follow efficient industrial education.

—RICHARD G. BILGER.

WESTERN STATES.

The Portland School of Trades has begun its second year with a large enrolment. Courses are offered in machine shop practice, plumbing, pattern-making, carpentry, cabinet making, electrical construction, mechanical and architectural drawing. The school was established in September, 1908. This year a department for girls has been added with courses in dressmaking, millinery and domestic science, while other courses will be given as the work develops.

An evening school of trades was established this year. All the trades offered in the day school are given in the evening classes. The evening school bids fair to exceed the day school in attendance. The shops are crowded each evening. The sessions are from 7:30 o'clock until 9:30 o'clock, five nights each week. A training class for instructors of manual training is conducted four evenings a week in connection with the evening school of trades. This is a step forward and will doubtless materially assist in the manual training work thruout the city.

Port Townsend, Wash., has introduced manual training in its course, hand work in all the lower gardes, benchwork and sewing in the seventh and eighth grades, and benchwork and brass work in the high school.

The high school at Compton, Cal., established a manual training department last September. Ralph W. Hornby, a graduate from the manual training department of Los Angeles State Normal School, was elected teacher.

The people of Los Angeles at a recent bond-election voted $300,000 for a new manual training high school. The land upon which the buildings are to be erected comprises ten acres and is located in the best part of the city. "This school," says the report of the Board of Education, "is not to be like the Polytechnic High School, nor like the old high school where classics are taught, but it will be a manual training high school, where common subjects are taught together with an abundance of hand tool work and domestic arts without teaching trades. It will teach that knowledge of home life and industries is essential." Dr. Albert Wilson, a graduate of the University of Berlin, Germany, has been named for the principalship.

The district schools of Cahuenza, Cal., have inaugurated manual training in their course of study. A complete sloyd room has been opened with Principal Schlegel in charge.

FROM MASON CITY, IOWA, HIGH SCHOOL.

REVIEWS.

The most discriminating and convincing report on industrial education that has come to our attention is the one on the conditions in New York State prepared for the Bureau of Labor Statistics by Charles R. Richards, Director of Cooper Union, New York City. This is a bound volume of 394 pages recently published at Albany by the State Department of Labor. It is discriminating because its author has made a careful study of conditions at first hand, and it convincing because each important statement is backed up with a large array of statistics or testimonies obtained by the field force of the Bureau.

The report contains eight chapters. First it gives a general summary, then the conditions of entrance and advancement in individual industries, the attitude of labor unions toward industrial and trade schools, comments of employers on industrial training, rules and agreements of labor unions in regard to apprentices and helpers, laws of the state relating to child labor, compulsory education, apprenticeship and industrial education, brief statements concerning institutions in New York State offering courses in industrial training, and finally a selected bibliography of the subject.

The general summary opens with the statement that "the problem of industrial training is one that differs radically in the different branches of industry;" "there is not *a* problem of industrial education but a hundred different problems, varying according to the nature of the different industries, according to local conditions as to wages and the size of establishments, and varying also according to the differing mental, physical and will capacities of the boys and girls entering the industries." The problems are most intense in trades demanding a high degree of skill.

The apprenticeship system and the attitude of the employer and organized labor toward apprentices is discussed. The report shows that the apprentice has fallen between the two. For example, in the matter of wages, "organized labor, with its mind solely upon the advancement of the standard of living, and the employer, with his mind almost solely upon the increase of profits, have neither been concerned to advance the wages of the apprentice, and with no influence to press them upward these wages have remained extremely low."

Perhaps the most valuable part of the report is that showing the attitude of the employers and unions toward the different types of industrial training—general industry schools for children from fourteen to sixteen years of age, day trade schools for those over sixteen years, and evening or half-time schools. Eight out of ten of the leading branches of industry expressed first choice for the general industrial school and two—the leather and cigar industries—for the day trade school. Six out of the ten gave second choice to the evening school. Concerning the general industrial school of intermediate grade the report says: "The emphatic indorsement of this type of school by both employers and organized labor should constitute a great encouragement to the educators who are endeavoring to develop such schools in different parts of the State." Concerning day trade schools the report says: "In spite of this pronouncement in favor of trade schools on the part of employers, the practicability of such schools in any considerable number is by no means demonstrated. The great economic difficulty of non-remuneration of the student worker under which the trade school labors will probably always act to restrict the numbers that can take advantage of such schools to the comparative few. Another fact that has a very important bearing upon this question is that a trade school training is a thoroly valuable asset only in such trades as are not highly specialized." Again, "Whatever its development may be, it does not seem probable that the trade school will become the medium for training large numbers for the trades, but rather that its office will be restricted to training superior workmen and men of the foreman type."

. . . . "The trade school must demonstrate a larger value, it must demonstrate that it can perform the function of training beginners in certain trades more efficiently and on the whole more economically than this can be done in other ways before it can take any large place as a factor in industrial training."

The main conclusions of the report are stated as follows:

1. The need of skilled male labor in the industries of the State is reported most severe in the manufacture of blown glass, many of the machine and metal trades, the manufacture of furniture, the manufacture of boots and shoes, the printing trades, and in certain of the building trades. For females the need is reported most serious in the manufacture of silk, carpets, braids and embroideries, and in the machine operating trades.

2. The apprenticeship system in such industries as machine and printing trades and certain of the building trades, is capable of being made more effective and a larger instrument of training skilled employes by the introduction of definite provisions for systematic instruction.

3. The need and value of general industrial or preparatory trade schools for boys and girls between 14 and 16 years of age is emphatically testified to by employers in all the industries and agreed to by the labor unions.

4. Practical trade schools seem to be most in need and to give promise of most practical results in the machine and building trades. Such schools are strongly urged also by employers in the boot and shoe trades, furniture manufacture, and the printing trades.

5. The extension of evening schools giving both practical and technical instruction for workers in the trades is demanded by employers in a large proportion of the industries. —CHARLES A. BENNETT.

Mechanical Drawing for Trade Schools. By Charles C. Leeds of the Carnegie Technical Schools. D. Van Nostrand Co., New York, 1909. 8 x 11 in. oblong; price, $.... This is the machinery trades edition of a book the high school edition of which was published about a year ago.. This contains 57 lessons while the former contained but 31. This one is therefore much more extended. The three subjects given special attention in the new problems are details of an electrical generator, cams, and structural iron work. The technic of the new problems is of the same excellent quality as those in the earlier edition. —C. A. B.

The following have been received:

Some Facts in Partial Justification of the So-Called Dogma of Discipline. By Stephen S. Colvin, Professor of Psychology, University of Illinois. School of Education, Bulletin No. 2, University of Illinois. This paper is an interesting contribution to the discussion of the subject of formal discipline. It maintains that a "generalized" habit is possible. The paper is in substantially the same form as when presented before the Illinois School Masters' Club, October 8, 1909. The discussion which followed the reading of the paper at that time indicated a substantial agreement with its claims. Any manual training teacher interested in the psychology of education will be glad to read this paper.

Summary of Legislation Concerning Industrial Education in Public Elementary and Secondary Schools. By Edward C. Elliott, Professor of Education, University of Wisconsin. Legislative Summary No. 1 of the American Association for Labor Legislation, Madison, Wisconsin. The result of a timely investigation. We have often needed just such a summary.

Report of Committee on Industrial Education. By Arthur L. Williston of Pratt Institute. Reprint from the Proceedings of the Society for the Promotion of Engineering Education, 1908.

Secondary Agricultural Education in Alabama. By C. J. Owens, President of the Southeast Alabama Agricultural School at Abbeville. Bulletin No. 220 of the Office of Experiment Stations, U. S. Department of Agriculture, Washton. Treats of the organization of district agricultural schools, equipment and work of the individual schools, examples of experimental work, etc. Eight plates of illustrations.

Los Angeles State Normal School Bulletin. Los Angeles, Calif. Contains outlines of courses in manual training, art, and domestic science.

Columbus Trade School. Outline of course of instruction in the new public school of trades at Columbus, Ohio. This school is under the direction of H. W. Lowell, the supervisor of manual training.

Albany Vocational School. By Arthur D. Dean, Chief of the Division of Trades Schools, Education Department, Albany, N. Y. A carefully prepared bulletin containing timely information on one of the new type of schools being started in New York State.

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ELEMENTARY SCHOOLS AS A FACTOR IN INDUSTRIAL EDUCATION.[1]

HENRY TURNER BAILEY.

I ONCE employed a man to enlarge my garden. A strip of rather stony ground was to be cleared along one side of a little orchard. Owing to the position of the young trees, a ledge, and the back line of my lot, the addition to my garden was to be of rather odd shape. The stones found in the plot were to be used in building a low wall to prevent the grass from running into the cultivated land from the orchard. I made a working sketch of what I wanted, with the dimensions, and in addition went over the ground with the man, pointing out the boundaries and explaining my plan. Yes, he understood perfectly! I will not weary you as he wearied me, day after day, with the details of this bit of work. Let me recount briefly the most instructive facts. The man could make nothing of my sketch, and forgot my directions. When I staked out a line he could not follow it. He borrowed my tools, because his own were not in good condition, or were missing. He could not estimate correctly the size of the hole required for sinking a rock; nor could he see how to place skids or use a bar to advantage in rolling rocks across plowed land. He could not plan his work to save the labor of rehandling material. Some of the stones and earth he moved three times, when once would have sufficed. In building the wall he could not see that a square stone would not fit into a three-cornered hole, until he had tried it every way, several times. He did not come to work every day and when he did come he came late and went early. On the larger rocks he needed help. I hired a second, who proved to be like unto him. They spent half their time looking at things and wondering.

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[1] An address delivered before the New York State Teachers' Association, Columbia University, December 29, 1909.

The boss, even with help, did not remove all the rocks; he did not get out all the roots; and parts of his low crooked wall fell down before he had finished it. I stood him as long as I could, out of pity for his wife and children, and then hired somebody else to finish the garden.

Recently I employed a man to rebuild the porch to my house. The work involved the removal of portions of the old porch, the addition of new parts in concrete, the matching of old shingled work, and the building of a balustrade with ornamental posts. I made a rough perspective sketch of how I wanted the completed porch to appear; and, knowing my man, told him to go ahead, to "find all and do all." He walked about the old porch, sketch in hand, for a few moments, and then began to measure and make notes. The next day my man arrived bright and early, with his complete kit of tools in perfect condition; masons appeared with all necessary equipment to do their part; and a teamster brought the required rough lumber. The work progressed steadily from the first, "without halting, without rest." The shingles came when needed. The posts appeared on time. When the balusters were required, there they were. Painters came to stain the new shingles to match the old and to paint the trimmings within an hour of the completion of the carpentry work. I received promptly an itemized bill of materials and labor which I paid as promptly, without a question, for the work was exactly right in every particular, and had been done in the shortest possible time consistent with thoroness.

These two incidents from life are typical. The man who undertook to enlarge my garden is fairly representative of the uneducated and therefore unskilled laborer in every field of industry. The man who rebuilt my porch is fairly representative of the educated and therefore skilled laborer. The first could read, write and cipher, but he lacked something which the second possessed, a something which George H. Martin has called "industrial intelligence." Men of the first type are the plague of the employer's life, and a burden to society; men of the second type are worth their weight in gold. The aim of modern education is to produce the valuable man in every department of human activity.

A close study of the two incidents I have recounted will reveal the qualities which efficient men possess. They may be briefly formulated as follows:

1. Ability to grasp a situation; to see what is to be done.
2. Ability to interpret directions, spoken, written, and drawn.

3. Ability to foresee what will be required, and to plan accordingly.
4. Ability to cooperate intelligently with others.
5. Ability to do thoroly well whatever is undertaken.
6. Ability to estimate values justly.
7. Ability to secure from work the highest satisfaction of success.

This seven-fold ability, which constitutes industrial intelligence, and is prerequisite to industrial efficiency, is no soft-pine growth. Its roots do not spread out just beneath the surface in the upper grammar grades as some of our enthusiastic friends would have us believe. No; its roots are tap roots; they strike straight downward thru every grade, into the subsoil of the home itself.

The part the home has to play in the making of efficient men and women is not included in the topic before us. That is overlooked in these days. Its turn will come. Procrustes is stretching the public school just now. When he catches the home, he will have some lopping off to do. But that is another part of the story. Our topic is the Elementary Schools as a Factor in Industrial Education.

The elementary schools are the *sine qua non* of industrial education; without them industrial schools are human-machine shops; and industrial intelligence is an impossibility; for true industrial intelligence is general intelligence plus. The elementary schools have stood for general intelligence, and must continue to stand for that. They must open to the child what wise Dr. Harris used to call "the five windows of the soul"—Language, Mathematics, Science, History and Art. The first right of every child is life, life in its largest sense, the life of participation in the commonwealth of humanity. Without such participation a boy never becomes a man, a girl never becomes a woman. Without such participation life is little better than the life of the beasts that perish.

Language, mathematics, science, history, and art, must ever stand first in the elementary schools. But these may be handled in such a manner that by means of them the seven-fold ability which constitutes industrial intelligence will be gradually developed from grade to grade. That ability is a matter of growth. It is in the last analysis a habit of mind; and habits do not spring up in a night like Jonah's gourd, nor do they spring up in a day like the stone-born children of Deucalion and Pyrrha. Habits develop slowly thru repetition.

The habit of mind which constitutes industrial intelligence is not the result of the repetition of any one specific activity, like feeding a machine with cardboard. That is the sort of activity which produces industrial stupidity—a product which short-sighted and long-fingered capitalists often belaud. The habit of mind which constitutes industrial intelligence is the result of the repetition of an attitude, an approach, a method, not in relation to one problem but many problems—all the problems of the daily life in elementary schools.[1]

To be specific (and brief), the ability to grasp a situation, to see what is to be done, will begin to develop as soon as the teacher stops thinking for the child and encourages him to think for himself. The formula should not be, "This is the way to solve this problem;" but rather, "Here is the problem; how shall we solve it?"

The ability to interpret directions, spoken, written, and drawn, will begin to develop as soon as the teacher stops meddling, and allows the child to try for himself. The formula should not be, "Well, who knows? We have no time to lose; the lesson period is almost gone;" but rather, "Don't hurry; take time to think it out."

The ability to foresee what will be required, and to plan accordingly will begin to develop when teachers cease to do work which the children ought to do. The formula should not be, "Here is the material you are to use for the lesson this morning;" but rather, "What material ought we to prepare for the lesson to-morrow morning?"

The ability to cooperate intelligently with others will develop when teachers cease to prohibit cooperation, and begin to encourage it. The formula should not be, "You must not communicate," but rather, "How can we help each other?"

The ability to do thoroly well whatever is undertaken will begin to develop when teachers cease to work for examinations and begin to work for excellence. The formula should not be, "If you don't get this done, you will not pass;" but rather, "If you do not do your best now, will you ever be able to do anything well?"

The ability to estimate values justly will begin to develop when we cease to give artificial problems, worked by school methods, for per cents and exhibits and the rubbish heap, and begin to solve real problems, by practical methods for useful purposes. The formula should not be, "This is educational and some day you will see the value of it;" but rather, "Is this worth doing? If so, let us do it now."

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[1] Examples of school work done under the inspiration of the larger ideal were here exhibited and discussed. The main conclusions are summarized in the paragraphs which follow.

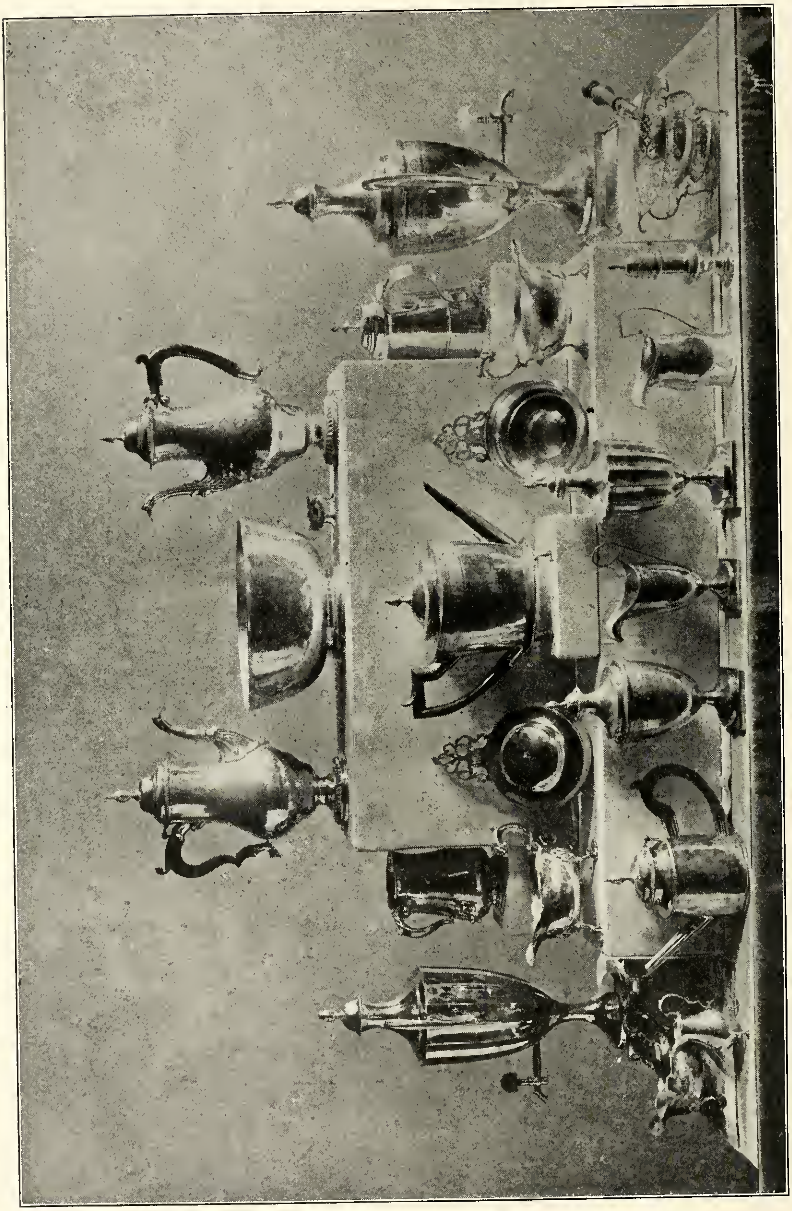
The ability to secure from work the higher satisfactions of success will begin to develop as soon as we cease to regard it as competitive and egoistic, and think of it as cooperative and altruistic. The formula should not be, "Well, you passed, anyhow;" but rather, "Have you done your part in making the work of this school excellent and useful?"

These seven revised formulas, held persistently before us and our pupils and followed in practice, in every grade of the elementary schools, will at last establish the right habit of mind—a habit of mind which will promote sense, intelligence, foresight, judgment, skill, probity, and vision ---the qualities which constitute true industrial intelligence.

To enable teachers to secure this invaluable result certain modifications in the organization and management of the elementary schools seem to be desirable. They may be stated as follows:

1. Fewer pupils per teacher. Twenty-four is a reasonable number, for division into various cooperating groups.
2. A more elastic school program. The pace should not be set by a printed ultimatum and an electric clock, but by the child's needs and the teacher's wisdom.
3. A more varied stock of unprepared supplies. Pupils should know the contents of the stock room, be led to select appropriate materials, and to prepare them for use.
4. Individual kits of tools in every grade, that each pupil may be held responsible for the condition of his own kit.
5. Individual record books, in the grammar grades, that each pupil may keep a true account of the cost of his work and his schooling.
6. More real problems, involving cooperation and yielding serviceable results.
7. Greater emphasis upon the child's school, civic, and industrial relationships, that he may realize himself from the first as a contributing member of the social whole.

The Elementary Schools, as a Factor in Industrial Education, may be raised to a higher power without changing their essential character. To change that character, to make them minister to commercialism instead of to general intelligence, to make them train skilful fingers content to supplement a machine, instead of sensitive minds content only with the highest ideals of the race,—that would be to make them promotors of industrial degeneracy rather than promoters of industrial health.



EXAMPLES OF THE WORK OF PAUL REVERE. FROM THE CATALOG OF AMERICAN SILVER, PUBLISHED BY THE MUSEUM OF FINE ARTS, BOSTON. BY PERMISSION.

COPPER WORK AS A RECENT DEVELOPMENT IN THE MANUAL ARTS.

Augustus F. Rose.

SINCE the introduction of manual training into the public schools of this country, the arts of joinery, sculpture, and mechanics in one form or another have formed the foundation or basis of this work, with wood, clay and iron as the materials. Recently, however, other industrial arts have been found to possess educational values equal to those first adopted. The arts of the potter, weaver, and silversmith, after being properly modified, are being applied to present day needs of this new form of education with excellent results. Those who are developing the manual arts have been led to believe that one of these arts, that of the gold and silversmith, has many possibilities, by substituting copper for gold and silver as the material used.

Work in copper itself is by no means a new development, for it is one form of metalwork, and workers in metal have been known all thru the ages. The art of working in the precious metals was practised by all the nations of the past that reached any degree of civilization.

The Egyptian goldsmiths, having an abundance of gold at their disposal, made all kinds of vessels and jewelry set with precious stones. Great quantities of gold objects and ornaments have been found in the tombs. Chaldeans, Assyrians and Phenicians too were skilled metal workers and it is said that they were employed to make censers, candlesticks, tongs, snuffers, and other necessary utensils for King Solomon's temple at Jerusalem as well as hooks, sockets and corner pieces for holding and securing parts made of wood.

In metal work the Greek craftsmen have produced work of a very high order, in many cases so perfect in workmanship that it is difficult to imitate or to explain the process. It was not only on their temples and the images of their gods that the Greeks put their best efforts in art; but in their vases, jewelry and humbler utensils of the household and everyday life, we find the Greek craftsman pouring out some of his richest fancies, and the same spell of beauty is cast over them all.

The splendor and magnificence of the decoration in Byzantine churches is the result of an abundant use of gold and silver, precious stones and enamels. The altar itself was a gorgeous piece of workmanship, decorated with hanging lamps, vases and candlesticks all wrought in precious metals tho the actual design and workmanship were rough and less refined than the antique work.

Santa Sophia and St. Marks possessed great quantities of all sorts of accessories of the altar which were made in abundance at this time. In Europe in medieval times kings and princes encouraged artists everywhere, and religious houses ordered splendid works for the use of their churches, so that a large portion of the gold and silver work which now exists, made in medieval times, was originally for sacred use and for church decoration.

In Saxon times the abbeys and monasteries encouraged the silversmith's art and the monks made ecclesiastical silver for the embellishment of the churches. At the Abbey of Glastonbury in England St. Dunstan promoted the making of silver plate and was himself a practical silversmith. He was of noble birth but became a monk and later was exalted to the office of Archbishop of Canterbury. He was not only a silversmith but a painter, carver and musician, and because of his remarkable versatility he was chosen to be the patron saint of the Goldsmiths of London.

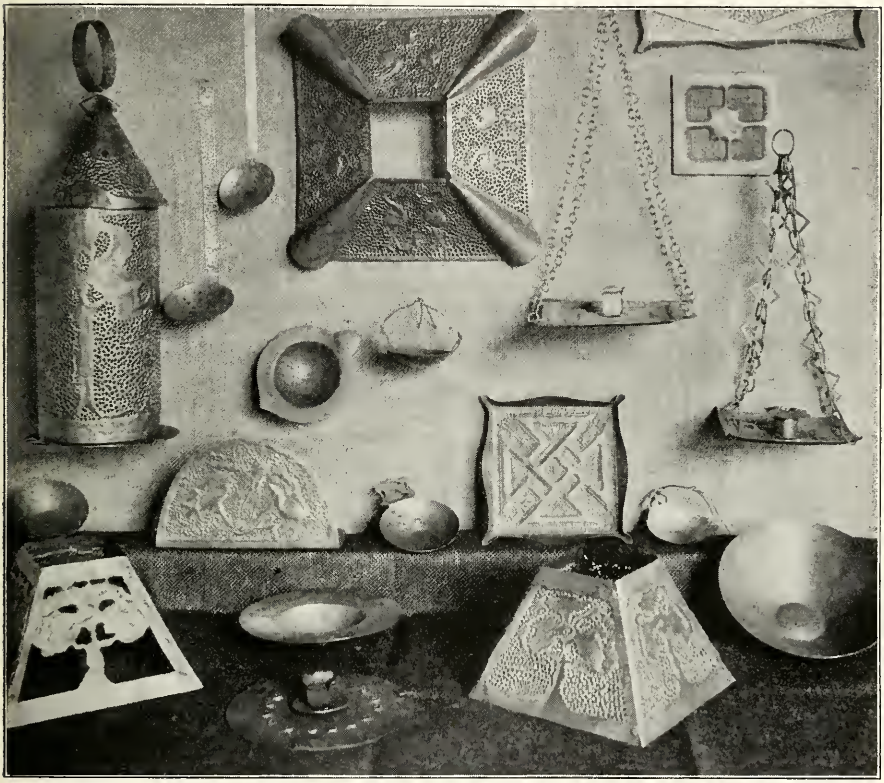
About this time silver came to be used much more extensively. The fifteenth, sixteenth, and seventeenth centuries produced many skilled silversmiths among the Norwegians, Germans, French and English.

An exhibition of American silver recently held at the Museum of Fine Arts, Boston, demonstrated that the art of the silversmiths was highly developed during our early colonial days and that the craftsmanship of our early native born artisans deserves wider recognition. This exhibition consisted of three hundred and thirty-two pieces of silver stamped with the marks of ninety American silversmiths of the seventeenth and eighteenth centuries, gathered together from various sources, many of the pieces being treasured heirlooms belonging to the descendants of the original owners. In the introduction to a catalog of this exhibition R. T. H. Halsey writes:

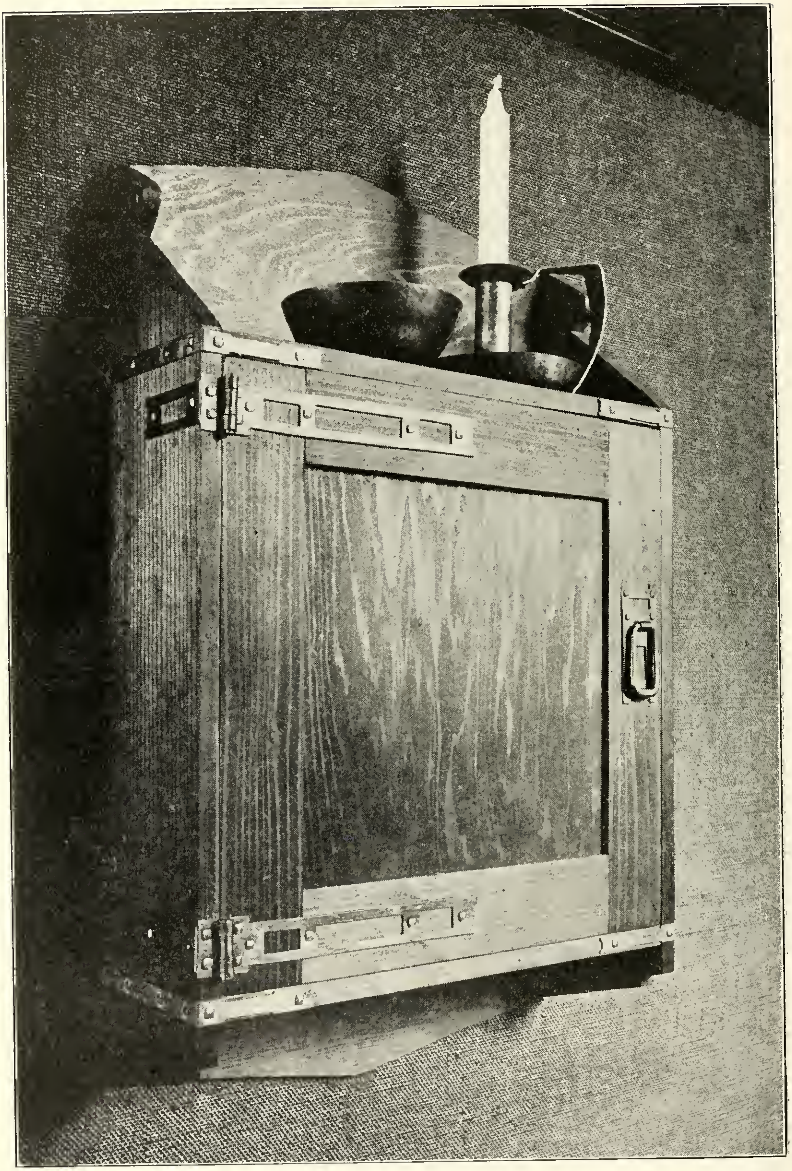
> It is the finest exhibition of early plate, American or European, yet held in this country. To Americans it has a far deeper interest in that it represents the artistic conception and craftsmanship of the fathers by whose energy our country was developed and our Republic formed. The silver is of the period when the ancient geometrical shapes held sway among craftsmen; when purity of form, sense of proportion and perfection of line were preferred to elaborateness of deign; when dignity and solidity were considered superior to bulk, and when the beautiful white metal was allowed to take its colors from its sur-

roundings rather than be made a medium for the display of skill by workers in metal.

A knowledge of history is considered essential to every well-informed person. Every student of Ancient History learns about the Egyptian tombs and Grecian temples, but little notice is taken of the various objects in gold and silver found within these same tombs and temples, and yet they represent some of the finest monuments of human existence. Our schoolroom walls are hung with reproductions of famous paintings, sculpture and architecture; are not the arts of the weaver, the potter, and the silversmith of educational value as well? History is coming to be considered as made up of something besides wars and battles, and



WORK DONE IN THE DANTE VACATION SCHOOL, CHICAGO, UNDER THE DIRECTION OF MISS JANNETTE PRATT.

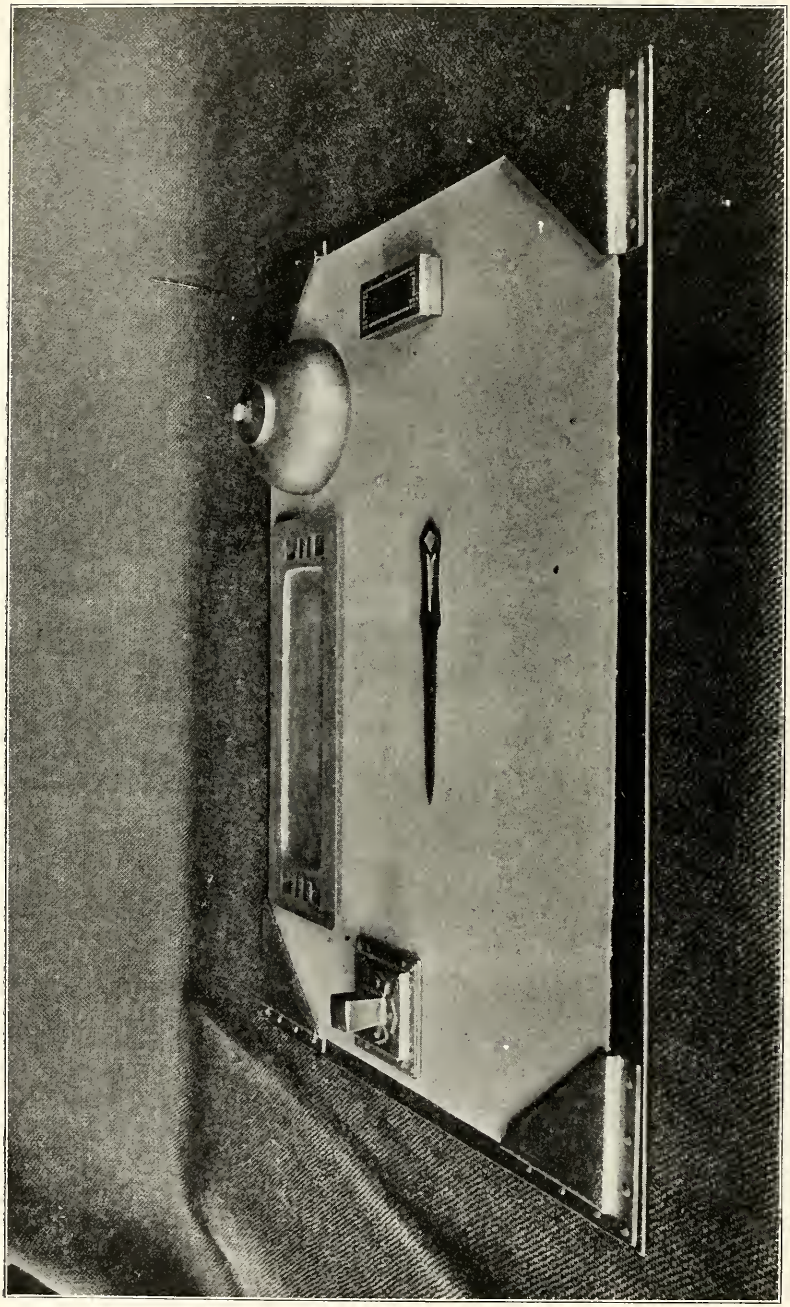


FIRST YEAR WORK, HIGH SCHOOL, EAST BOSTON, MASS. APPLICATION OF METAL TO WOODWORK.

every chance to correlate should be used. Every child knows the name of Paul Revere in connection with his famous ride, but probably few know that he was the most famous of Boston silversmiths. It would seem as if here were an opportunity for correlation by teaching history or one phase of it by means of copper work or any form of the manual arts where objects of the past had survived.

Interest is an element that must be developed in any subject if the student is going to realize the most good for the time spent upon it. How to create interest is the thought that has occupied the minds of educators in the past and is receiving much attention at the present. In its beginning copper work had a self-created interest and developed rapidly because this interest was easily retained. There is probably no subject in the manual arts that holds the boy's interest as copper work. Let him take a piece of sheet copper as it comes from the rolling mill, tell him something of the mining, refining, assaying, smelting and rolling of this before it takes the form as he now sees it. Show him how the flame from the blow pipe affects it. Let him see the beautiful colors that play over it while being heated, and that what was once hard or difficult to bend, after being heated becomes soft and pliable. Going thru this process he not only works out an experiment in physics by learning where the hottest part of the flame is, but he also sees the chemical action on the metal caused by the heat, changing the surface from a bright golden color to a black scaly one. To remove this black scale and give it its original color he learns also the action of certain chemicals or acids upon it. Then let him take a hammer and by hammering it first one way and then another for a while he finds it is perfectly obedient and that he can make it take any form he may desire.

The way in which copper work was first introduced is similar to the beginnings of other branches of the manual arts. Teachers of drawing and manual training first became interested and after spending considerable time in studying the subject to see if it was practicable for public school work and being convinced that it had many possibilities, endeavored to demonstrate the advantages afforded the pupils in becoming acquainted with another material. In presenting it to public school pupils the first thing necessary was to put the exercises or problems in a form that was within their possibilities and that was not only useful but of some real value to them when completed. Some teachers have introduced the subject by correlating it with wood work, making metal trimmings for objects made of wood, such as handles of various kinds, hinges, escutcheons, corners, and straps to strengthen joints.

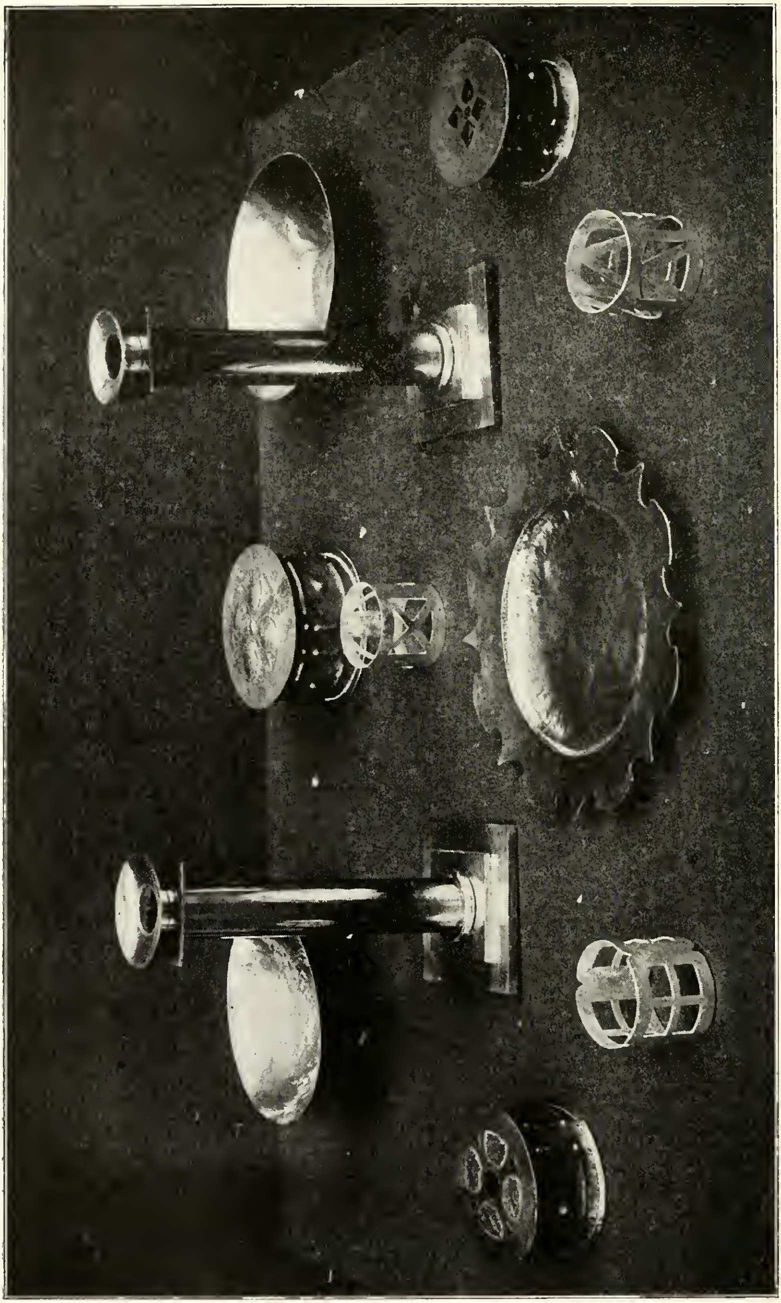


SECOND YEAR WORK, HIGH SCHOOL, EAST BOSTON, MASS.

When the pupil has not only designed the box, or cabinet or whatever it may be, but also thought out and made drawings for the trimmings or hardware for the same and then carried them out in copper, the object when completed has an interest attached to it never to be forgotten. In many cases this work has been started in this way by the teacher of wood work bringing it in with the regular course, thus enabling the pupil to become familiar with the necessary tools and also making it easier to take up the more advanced work.

WORK DONE BY STUDENTS AT THE RHODE ISLAND SCHOOL OF DESIGN, PROVIDENCE.

Some who have not had the opportunity of introducing copper work thru the woodwork have made a beginning by encouraging a few pupils



WORK DONE BY PUPILS IN THE MANUAL TRAINING HIGH SCHOOL, BROOKLINE, MASS., UNDER THE DIRECTION OF ALEXANDER MILLER.

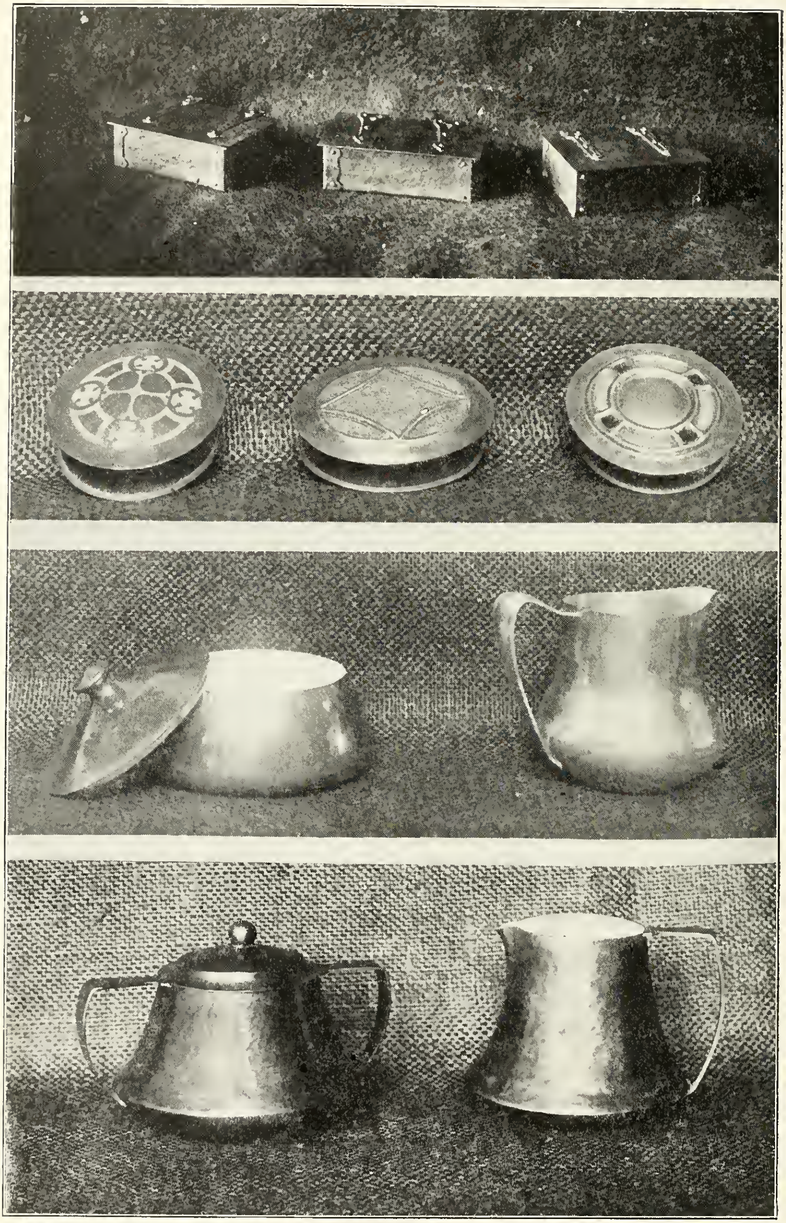
to work after school for a half hour or so. Others soon became interested and asked for the privilege of joining (the after school class) and from this kind of beginning the work has grown and developed until it is now given a place in many school courses side by side with other subjects. This has been done, however, only where its value has been fully demonstrated to superintendents or those in authority.

Schools of design and normal art courses in art schools now make this form of metal work a requirement, believing that the student of design has a better knowledge of his subject after working in some of the materials he has been designing in; and normal art courses require it because of the ever increasing demand on teachers' knowledge of practical as well as theoretical subjects.

The teachers who first taught manual training were not trained in a normal school as teachers were trained for teaching other branches, but they were men who had had several years of practical experience at either the joiner's bench or in the machine shop. These men had merely the practical side of the work with no knowledge of teaching or of systematizing their work. Teaching ability is fully as essential for this subject as for any other and to secure men to teach this new line of work who have been trained in the silversmithing art is impossible and impracticable. If such men were engaged the results would be the same as produced by the pioneers in manual training work, severely mechanical. Men who have the ability and the necessary experience in teaching who wish to prepare themselves for this work have been obliged to go into the shops and work side by side with the artisan craftsman to get the practical side of the art. Such men must not only be able to get the practical side of the work, but after getting it to be able to reduce it to terms of the manual arts. The mechanical methods employed in the shop must be transformed to produce results that show at a glance individuality and the embodiment of good design, and too much emphasis cannot be laid on the design element of the subject.

PROPERTIES OF COPPER.

Because of certain properties the material best suited for this work is copper. Cuprum, the scientific name for copper, is derived from the Isle of Cyprus, where, it is said by Pliny, the Greeks discovered the method of mining and working it. In malleability it stands next to gold and silver in the list of useful metals, and in ductility it occupies the fifth position, while in tenacity only one is superior, that of iron.



WORK DONE BY SUMMER SCHOOL STUDENTS, RHODE ISLAND SCHOOL OF DESIGN, PROVIDENCE.

With the above mentioned qualities copper is peculiarly adapted to educational purposes, where its possibilities are almost without a limit.

The cost of materials for this work has been a stumbling block to some. It is true that the same amount of money expended for materials in wood goes farther than for copper, so far as quantity is concerned, but the pupils get fully as much, and in many cases more, educational value from the metal than from the wood. I would not for a minute advocate the doing away with wood for it will always have its place as I believe metals of various kinds should have their place in all well planned courses in the manual arts.

In ordering materials if a little discretion is used, almost any appropriation can be handled to include copper. It is better to get along with less wood and give the pupils an opportunity of becoming acquainted with another material. The cost of the material should be taken into consideration when planning a course and should govern the size as well as the choice of all exercises or problems.

It is not practicable to attempt to do any work in copper below the fifth grade, because the mediums already employed give the children enough scope and because it is too difficult for younger ones to handle. By the time the fifth and sixth grades are reached, however, it is advisable to begin using the copper. Very thin sheets are first used, thin enough to be easily cut with a pair of scissors or light shears, or to be bent into shape with the fingers. Any desired decoration is applied either with the point of the scissors or with a nail.

PROBLEMS.

There are many objects that can be made of this thin copper, but to get successful results the teacher must ever keep in mind the design as well as the object. Much can be done right here toward cultivating a taste for the beautiful.

The following problems may be adapted to fifth and sixth grade work:

Book Mark
Pin Wheel
Portfolio or Scrap Book Bindings
Bank for Savings
Pin Tray
Candle Holder
Lantern
Letter Opener
Match Scratcher
Napkin Ring
Whisk Broom Holder
Match Box
Candle Shade

The form of construction which enters into this grade of work must of necessity be very simple.

In the seventh and eighth grade work there are many more possibilities because of the maturity of the pupils both mentally and physically. Here it is possible to use metal much thicker, making the problems more substantial and useful. The pupils of these grades have the use of some woodworking tools and by the addition of a very few others for metalwork, a large variety of problems or exercises, whichever we choose to call them, may be worked out.

All exercises in this work should be of some real value to the pupil; no time should be spent on work done simply for practice, but the various steps should be learned in the making of useful objects of artistic worth. In this as in other work it seems best to give all members of the class the same work for a while until they have become acquainted with the different tools and learned the limitations of the material. When this has been accomplished each pupil may be allowed to work out his own designs. When this can be done the educational value is very greatly increased. The pupil conceives the idea and makes several sketches of it, carrying it thru repeated changes until it is brought to the perfected design appropriate in every way to the original idea. If the design can be modeled in clay or modeling wax the educational value is increased four fold.

The seventh and eighth grade course may be planned in such a way as to carry the copper work along with the wood work by applying some of the exercises in metal, such as fittings for a cabinet, box or chest.

An Escutcheon
Handles of various kinds
Hinges
Corners and straps to strengthen joints

Other problems complete in themselves such as:

Card Trays
Pen Trays
Ink Wells
Desk Pad Covers
Paper Covers
Lanterns
Sconce, &c.

Riveting seems to be the best method of fastening for this grade of work.

Altho most of the grade work is confined to flat work the high school course should be planned to include problems in hard soldering, repoussé, raised work, jewelry and enameling.

Many of the problems given in the seventh and eighth grades may be given in the high school when designed in such a way as to call for more mature experience. The thing that perhaps is of most importance in connection with this work is design, which is essential for the best results. Pupils taking up copper work in the high school should be able to draw well freehand and should be given a course in design at the same time. The course in design should include a study of the metalwork of the past and present. Photographs or plates of metalwork found in public libraries are most useful for this part of the work, except where sketches or drawings can be made from the objects themselves found in our art museums. Copying such illustrations or making tracings from them helps as in no other way the appreciation of form and proportion. Clippings from current magazines mounted and classified and hung where they may be seen repeatedly have a decided influence on the pupil's work. Tracings made from such photographs or plates as are not allowed to be taken from the library, when mounted make another addition to a working library.

It has been impossible to secure illustrations to give an adequate idea of the extent to which copper work has been developed, but those given will surely prove its right to a place in every manual arts course. There are few schools that teach any form of the manual arts that do not teach metalwork, and copper is generally the metal used. The opportunities afforded for correlation, the element of interest, the individuality developed in the pupil, and the possibilities of teaching design, are sufficient grounds for its continued existence among the manual arts.

EQUIPMENT.

Many teachers have never attempted to take up copper work feeling that a costly equipment is necessary, but this is not true. The equipment for this work may be as extensive or as limited as one desires to make it. Much can be done with a very few tools. Teachers will find that a few of each of the different tools will do to carry on the work in a class of twenty or twenty-four pupils, as but few would need the use of the same tool at the same time. There is not the same need for individual outfits in copper work as in woodwork, for the reason that there are no sharp edge tools to be kept in condition.

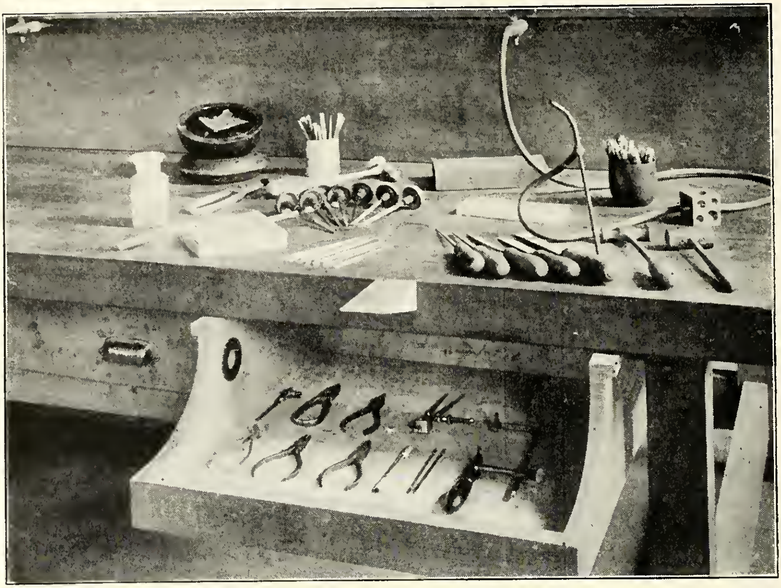
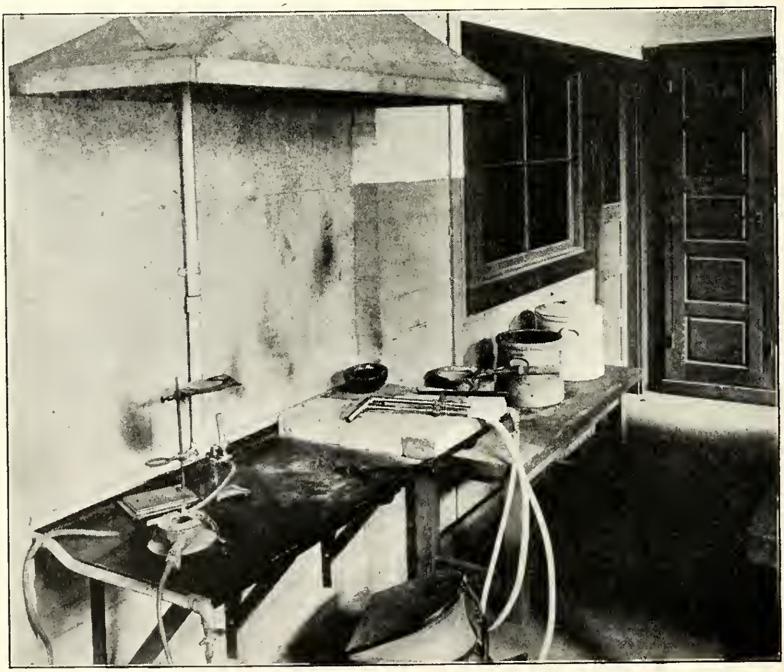


FIG. 1. EQUIPMENT FOR FLAT WORK AND JEWELRY.



ANNEALING TABLE AND CONNECTIONS.

The following list may be found helpful to those who are about to begin the work or perhaps to those who have already done the elementary work and would like to do the more advanced work.

For the fifth and sixth grade the work may be carried on with the following tools:

Pair Hand shears or heavy scissors
1¼-inch Rawhide mallet
3-inch Wire nail
12-inch Rule

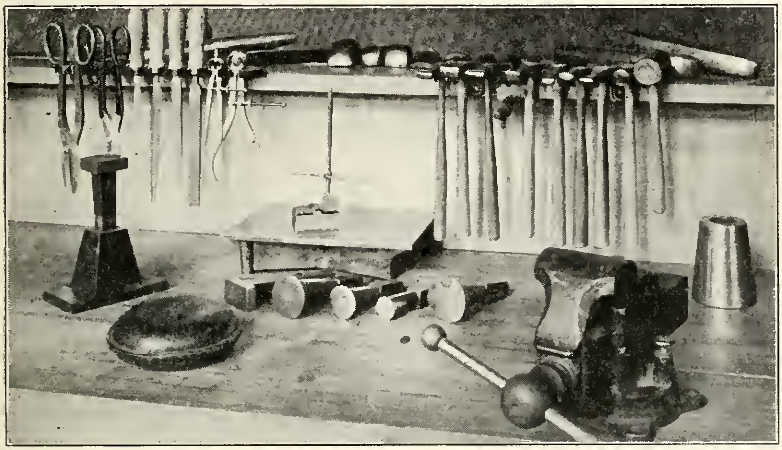


FIG. 2. EQUIPMENT FOR RAISED WORK.

For seventh and eighth grade work a more varied equipment will be found necessary:

4-inch Metal saw frame
No. 3 Piercing saws
2½-inch Hand shears
7-inch Mill file, 2nd cut
7-inch Smooth half round file
1¼-inch Rawhide mallet
¾-inch Machinist's riveting hammer
Hand drill
Assortment of drills from 1/16 to 3/16-in.
Center punch
5-inch Side cutting pliers

The same bench used for woodwork may be used for metalwork but it is better to use a separate bench if possible.

An equipment for high school use may be planned for either flat work, or raised work.

The tools for flat work are as follows:

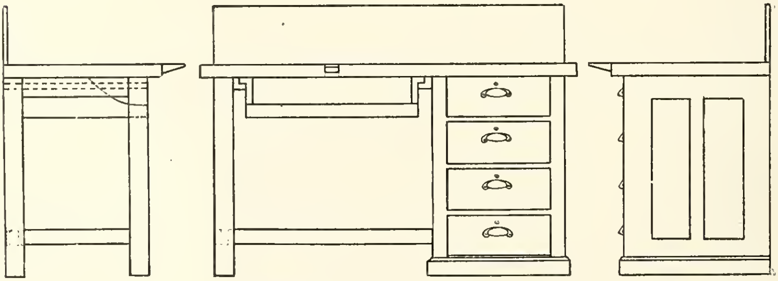
4-inch Metal saw frame
Nos. 1, 2, 3 Piercing saws
5½-inch Brown shears
5-inch Swedish end cutters
5-inch Flat nose pliers (smooth)
5-inch Round nose pliers (smooth)
5-inch Chain pliers (smooth)
5-inch Compasses, solid nut
Pin vise
Set of 24 Dapping punches
Dapping die
Chaser's ring pad
Set of 12 chasing tools
Pitch pot
1 dozen 5½-in. assorted needle files
6-inch Half-round crossing file, No. 0
6-inch Round slim file, No. 0
6-inch Square slim file, No. 0
6-inch Hand file, No. 0
6-inch Steel rule
Set of Vautier engraving tools
Ring clamp
Borax slate
4-inch Tweezers
1¼-inch face Tissot chasing hammer
1¼-inch face Rawhide mallet
Bench pin
Mouth blow-pipe
Draw plate
Draw tongs
5x7-inch Charcoal block or
5x7-inch Asbestos blocks

Equipment for raised work:

4-inch Swivel vise
Set of anvils, stakes and small forms
Raising hammer
A variety of planishing hammers
6-inch Dividers
6-inch Calipers
8-inch Half-round file, 2nd cut
8-inch Mill file, 2nd cut
6-inch Half-round file, smooth
6-inch Hand file, No. 0
Straight hand shears, 2½-inch cut
Curved hand shears, 2½-inch cut
12-inch Steel rule
6-inch Solid engraver's pad

The following would be used in general by all members of the class:

No. 10 Buffalo dental foot bellows
Blow pipe, ⅝-inch gas supply
Annealing tray or table
Pickle pan
4-gal. Stone jar for pickle
4-gal. Stone jar for water
Surface plate, about 8x10 inches
Surface gage
Bunson burner
Gas plate, single burner
Light tongs
Polishing lathe
Small upright drill
Assortment of drills



BENCH FOR METALWORKING.

MACHINE DRAWING FOR EVENING CLASSES.

ARTHUR B. BABBITT.

THE problem of the evening class is one that many of our day teachers are called upon to solve and many times, because of the pressure of the day work, it receives too little attention. Yet these classes, composed of men who have not had the opportunity before or if they have had it have not availed themselves of it, should receive the very best of what there is in the special subject they wish to pursue. To the teacher who is busy with the day work, it is hoped that the suggestions herein contained may be of value and thru them benefit that large body of students who are anxious to improve their condition by attending the evening school.

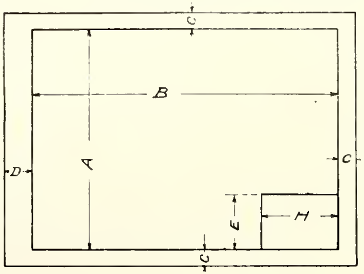
The plan given here is one that has been worked out by the writer for the Hartford Evening High School, Hartford, Connecticut, after a number of years of evening school experience. It has stood the test of the classroom, and has been the means of holding the classes well thruout the season.

Good, practical machine drawing must be taught these pupils, and emphasis must be given to this in preference to the theory of projection and its allied subjects. The majority of men who take these courses work from, and daily come in contact with, the genuine article in the shops where they are employed, and altho not able to make a drawing and in some cases even read one without considerable time and study, yet their shop experience and training are such that they realize what they want and need, and if they do not get it will drop out of the class.

In planning this course the writer has endeavored to arrange it particularly strong in the application of the projection work to the shop drawing and to fit the men to do practical drafting room work. Not that all of the projection work has been eliminated, but it has been reduced to such an extent that only those problems are employed which enable the workman to distinguish the form of an object, to understand the relation of views to each other, and work out the changes in one view due to a change in location or a revolution of another view. The instructors do not insist that the students understand the relation of the object to the planes of projection, do not express themselves in terms of horizontal projection, vertical trace, etc., and expect only that the

PAGE 1

Standard Sizes of Drawings.



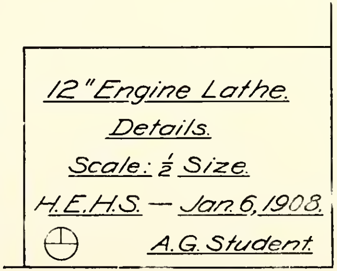
A	10	14	20	28
B	14	20	28	40
C	¾	¾	½	¾
D	1¼	1¼	½	¾
E	2½	2¾	3	3½
H	3½	4¼	4½	5

Titles.

General plan of title, style of lettering, etc., for standard drawings.

Title consists of:

1. Name of Machine.
2. Details—Assembly.
3. Scale.
4. Firm name and date.
5. Draftsman's name.



PAGE 2

Plate 1.

Machine Drawing of Single Piece from Sketch

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Notes.

Have drawing complete in pencil and approved by instructor before inking. When inking, use shade lines and observe the order given on the next page. This order should be followed whenever a drawing is to be inked.

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* Students will place on dotted lines the names of machine or part drawn. This will serve as a record of work done.

pupil shall be able to draw three views, "one looking from the front of the object, one from the side, and one from the top." These must have the proper relation to each other when drawn, and the student must be able to work out a third view having given two.

It must be understood that this refers to the evening classes at the high school and not to the work of the day classes. These are two entirely different propositions for an instructor, and while a solution of one helps with the other, a course formulated for one would prove disastrous if used in the other.

Before taking up the projection work, the classes are given sketches, sometimes in perspective and sometimes in orthographic, from which are made working drawings of simple pieces. This is the manner in which the first part of the first year work, as shown by the following synopsis, is presented:

SYNOPSIS OF COURSE IN MECHANICAL DRAWING.

First Year.—Use of instruments, simple working drawings from sketches, scaled drawings, sectioned drawings, projection, revolution, true length of line, true shape of surfaces, development, intersection of surfaces, screw threads, machine fastenings and line shading.

Second year.—Machine drawing from sketch, modified design drawing, detailing from an assembly drawing, construction drawing from details, technical sketching from machine and full set of working drawings from sketches.

Third Year.—Plotting mechanical motions; uniform, crank and gravity cam curves; face, disc, cylindrical and special cams and spur, worm and bevel gearing.

Following the subjects of projection, screw-threads and machine fastenings, a pamphlet giving a general synopsis of the work in machine drawing is handed the pupil to be kept by him for directions and as a reference.

In this pamphlet the pupil finds. in addition to the synopsis, directions for working up each drawing or series of drawings, also a reference to the conventions to be employed in the different problems.

The pages of the pamphlet are reproduced herewith with such added information as seems necessary to make the object and scope of the course clear.

Page 1 needs very little explanation, being used only to give the standard sizes of drawing and plan of title. Standard size sheets only can be used, and all titles must be uniform. The cap letters in the title

PAGE 3

Plate 2.

Order to be Followed when Inking

Group I { *Object lines. Black. }
1. Arcs of circles; begin with the largest.
2. Irregular curves.
3. Horizontal lines; begin at the top.
4. Vertical lines; begin at the left.
5. Oblique lines.

Group II { Center, witness, and dimension lines. †Red. } Use same order as in Group I.

Group III { Dimensions and arrow-heads. Notes. Title. Black. } Ink in order given.

Group IV. Section lines.† Black.

Group V. Margin lines. Black.

*When shade lines are used, shade arcs and circles at one setting of compasses. For straight lines, ink all the fine lines, and then, after opening the pen, ink all heavy lines.

†Should be finer than finest object lines.

PAGE 4

Plate 2.

Working Drawing of Machine or Attachment from Sketch.

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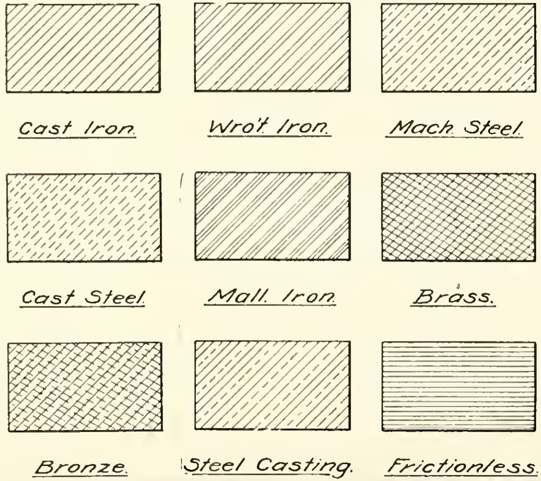
Inking.

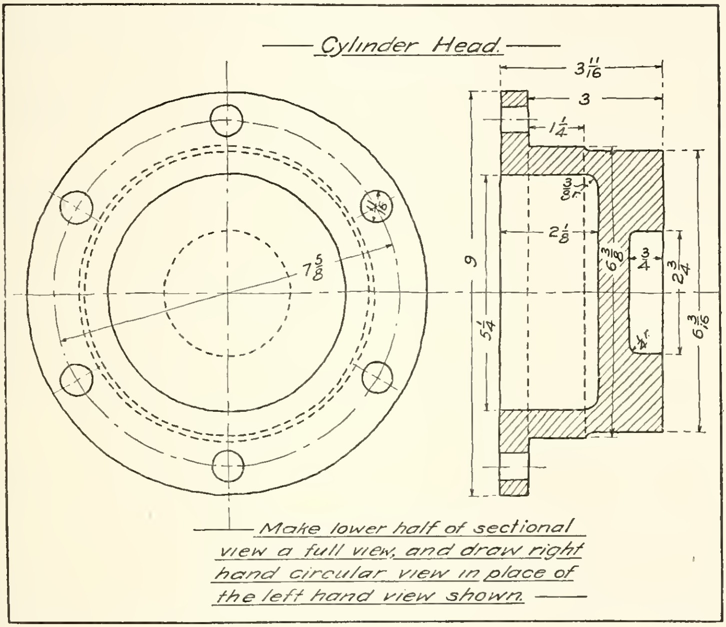
Follow directions for inking Plate 1, using conventional section lines for different material.

Conventions for Material.



are to be made 3-16ths inch high and the main body of the small letters 1-8th inch high.

The circle in the lower left hand part of the title is for series, plate, and pupil's number. The series of which the drawing is a part is placed in the upper left hand section, the number of the drawing in the upper right and the pupil's number in the lower section. All drawings are kept until the close of the year, and are filed by the pupil's number, after being carefully checked by the instructor in charge.


Cylinder Head.

Make lower half of sectional view a full view, and draw right hand circular view in place of the left hand view shown.

SAMPLE PROBLEM FOR PLATE 1.

On each page refering to a plate or series of drawings blank lines are provided upon which the pupil enters the subject of the study. This enables the student to keep a complete record of work done and assists the instructors in selecting and assigning new problems. Page 2 as shown refers to the first plate of machine drawing, which is an introduction to the course. This is partly copy work. In it, two views, not the same as those given, are required; the result being a simple detail. The sample problem gives an idea of the introductory plate. This, too, is the second sheet in shade lines. It might be said in this connection that there are only three problems in the entire course involving shade lines. This seems sufficient to fix the subject in mind and as they are used comparatively little in actual practice, it is considered sufficient drill in this subject.

In all of the problems in the course, a variety of subjects is employed to avoid the tendency to copy work, and in order that work suitable to the individual may be chosen.

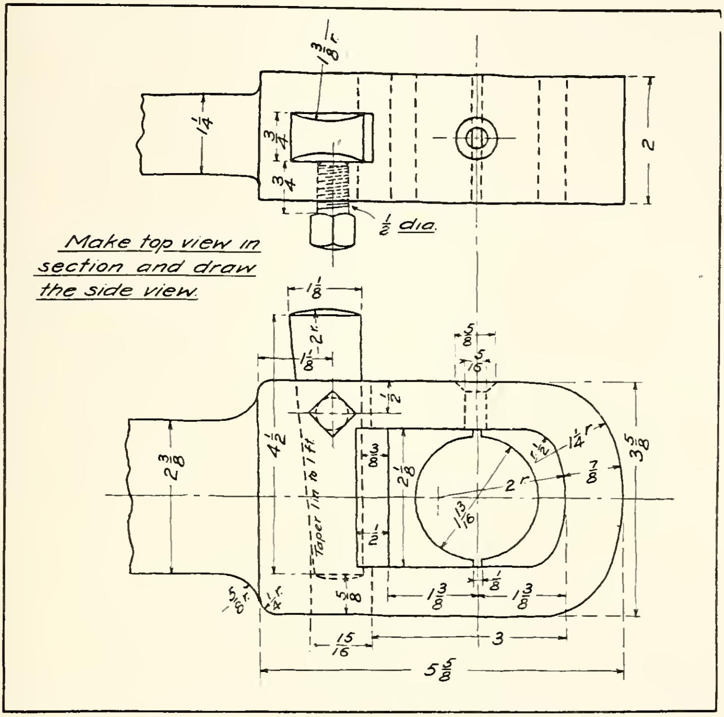
At the lower part of Page 2 it will be noticed that a certain order for inking is refered to and that the student is required to follow this order in his work. It is the object of the course to have all work done in a systematic manner, and great emphasis is laid on this part of the work. Page 3 shows the order for inking referred to, and is suggestive of the work leading up to this part of the course.

Page 4 gives directions for the second plate in machine drawing. Two views are usually given, the problem being to convert one of these views into a sectional view and to work out the third view.

It will be noticed that conventional sections are used in this problem. This calls attention to the fact that different metals are sometimes denoted by a change in character of section lines, and gives opportunity for the instructor to talk on the subject. This is the only plate where these conventions are employed. A sample problem is given.

The next drawing, as shown by Page 5, is what is known as a "modified design study." A blueprint assembly drawing is furnished the student together with a smaller study print giving changes or modifications of design to be made on the larger drawing. For example, the drawing of the head-stock of a 6-inch or 8-inch hand lathe, having two steps on the driving cone, will be given, with the requirement that the two-stepped cone be changed to a three-stepped cone of given dimensions. These dimensions are such that it necessitates lengthening the head-stock casting, thereby changing curves, etc. Sometimes other changes are called for, such as diameter of spindle, making necessary a different proportion for bearings. These problems always prove interesting and instructive and usually bring pupil and teacher together. This in itself is of great value to both persons, giving the pupil a closer acquaintance with the teacher, and the teacher a better knowledge of the best way to approach the pupil.

The next problem in the course as indicated by Page 6, is a problem in detailing. An assembly drawing of either a speed lathe head-stock or tail-stock, milling machine vise, large valve, or some similar piece, is given the pupil from which a complete set of detail drawings is required. It will be noted that these drawings are made on bond paper, thus calling the pupil's attention to the fact that the shops are governed, to a certain extent, by the requirements and limitations of the blueprinting process, and that this is a way by which the duplication caused by original drawing and tracing may be avoided. This detailing is watched very carefully by the instructors in charge and after the drawings have been handed in they are checked up thoroly and, if found incorrect or incomplete, are returned to the workman for correction. It is rarely that a set of drawings made under this series passes the checking process the first time. This checks the students whose tendency is to be careless and makes them feel that they are responsible for correct work. The men are remarkably pleased if only a few corrections are to be made, and it is rapidly becoming a matter of rivalry among them.


Make top view in section and draw the side view.

$1\frac{3}{8}$ r.
$1\frac{1}{4}$
$\frac{3}{4}$
$\frac{3}{4}$
2
$\frac{1}{2}$ dia.
$1\frac{1}{8}$
$\frac{1}{2}$ r.
$1\frac{1}{8}$
$\frac{5}{8}$
$\frac{5}{16}$
$\frac{1}{2}$
$4\frac{1}{2}$
Taper 1 in 1 ft.
$2\frac{3}{8}$
$\frac{3}{8}$
$2\frac{1}{8}$
$\frac{1}{2}$
$1\frac{1}{2}$
$1\frac{1}{4}$ r.
$3\frac{5}{8}$
$\frac{7}{8}$
2 r.
$1\frac{13}{16}$
$\frac{5}{8}$ r.
$\frac{1}{4}$ r.
$\frac{5}{8}$
$1\frac{3}{8}$
$\frac{1}{8}$
$1\frac{3}{8}$
$\frac{15}{16}$
3
$5\frac{5}{8}$

SAMPLE PROBLEM FOR PLATE 2.

PAGE 5

Series 1—Plate 1.

Modified Design.

....

....

Modify the design shown on large blueprint to satisfy the conditions given on small blueprint. Make drawing complete, with all necessary dimensions.

Inking.

Do not line-shade the drawing. Use the cast-iron section for all material. Follow the order given on page 3.

PAGE 6

Series 2—Plates 1, 2, 3, Etc.

Details from Assembly.

....

....

Make, on bond paper, a full set of detail drawings from the assembly drawing furnished by instructor. Classify the drawings by material, placing castings on one sheet or series of sheets and steel work on another. Indicate the surfaces to be finished by the letter f.

Place the title for each piece below the drawing, making capitals about 1/8" high.

This title should consist of:— (1) The name of the part. (2) The number of pieces used on one machine. (3) The material from which the part is made. Thus: Bearing—One—C. I.

Use the following abbreviations for different metals:—C. I.=Cast Iron. W. I.=Wrought Iron. M. S.=Machinery Steel. T. S.=Tool or Cast Steel, M. I.=Malleable Iron. S. C.=Steel Casting. Br.=Brass. For all other material print the full name.

Inking.

Follow directions for inking Series 1, Plate 1.

PAGE 7

Series 3—Plate 1.

Assembly from Details.

……………………………………………

……………………………………………

Make, on brown paper, an assembly drawing from the set of details furnished by instructor. Do not put dimensions on the drawing.

Inking.

Follow directions for inking Series 1, Plate 1.

PAGE 8

Series 4—Plates 1, 2, 3, Etc.

Sketches.

……………………………………………

……………………………………………

Make free-hand sketches, in details, of machine or attachment.

Use as much care in making the sketches as you would the finished drawing. All standard screws, etc., may be listed. Sketches must be complete, for no reference can be made to model when Series 5 is drawn.

Follow the directions given below when sketching each piece:

1. Handle model as little as possible.
2. Select the number of views necessary to illustrate the object.
3. Draw these views in their proper relation.
4. Put on dimension lines and arrowheads.
5. Measure object carefully and insert dimensions.

PAGE 9

Series 5—Plates 1, 2, 3, Etc.

Details from Sketches.

....

....

Make full set of detail drawings from sketches, without reference to model. Drawings are to be made in pencil on brown paper and traced on tracing cloth.

Follow the rules of practice given on pages 11 to 16.

PAGE 10

Series 6—Plate 1.

Assembly from Details.

....

....

Make assembly drawing from Series 5. Note all errors and omissions on the details, and when Series 6 is finished complete Series 5.

Series 3, Plate 1, shown on Page 7, is just the reverse of Series 2. This is the making of the assembly drawing from details. Many times blueprints of some student's details are used. This tends to make the men work still more carefully.

Having taken a problem in detailing and another in assembly drawing, the next in order is technical sketching. The directions for this work are given on page 8 of the pamphlet. Here, too, it is the object to get the student working in a systematic way and several steps to be followed are numbered with that object in view.

Having completed the sketches the model is removed and the pupil is required to make, from his own sketches, a full set of details for Series 5 and then from the details Series 6 is drawn. Pages 9 and 10 of the pamphlet, referring to Series 5 and 6, are shown.

A study of the combination of Series 4, 5 and 6, will show that the details become the check to the sketches, and, in turn, the assembly checks up the details. This is the most instructive and helpful combination in the whole course, for we get the student to draw what he sees, and at the same time to make each step in the process a check on his previous work.

The rules of practice given below have to be followed by the pupil in making this set of drawings. These make him conform to certain conventions as he would have to in regular practice.

RULES OF PRACTICE.

DRAFTING ROOM.

MANUAL TRAINING DEPT. HARTFORD PUBLIC HIGH SCHOOL.

Lines.—Object lines, visible and invisible, are to be in black ink and the same width. Center, witness and dimension lines to be in red ink.

Center lines, thus: —— – ———————
Witness lines, thus: - - - - - - - - - - - - - - - -
Dimension lines, thus: |←——— 4½ ———→|

Selection of Views.—Select the number of views necessary to illustrate the object, no more, no less. When a note will save the drawing of an extra view do not hestitate to insert it. Use dotted lines sparingly, using section views in preference.

One view is sufficient when showing circular pieces and, when interior details are to be shown, make that view a section.

Scale and Size of Sheet.—Choose the largest possible scale and the smallest size sheet consistent with good work.

Castings and Forgings.—Make drawings of castings and forgings on different sheets. Castings, upon which very little machine work is to be done, may be drawn at a reduced scale. Forgings should be drawn full size if possible.

Title for Details.—Each detail should have its name, the number used on one machine and the material from which it is made printed, in letters whose capitals are about ⅛-in. high below the drawing. See Figs. 1 and 2.

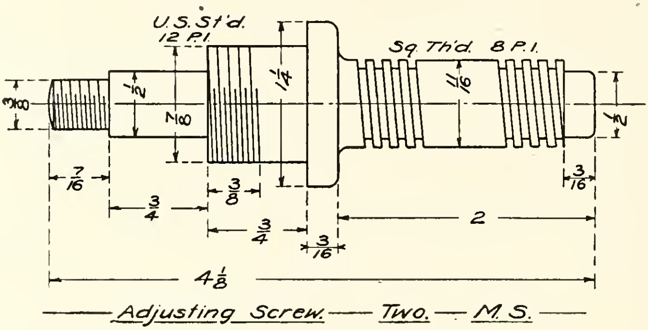


FIG. 1. SAMPLE DRAWING TO ILLUSTRATE DETAILS.

Abbreviations for Metals.—When placing the title under the detail drawings, use the following abbreviations for different metals:

C. I.—Cast Iron.
W. I.—Wrought Iron.
M. S.—Machinery Steel.
T. S.—Tool or Cast Steel.
M. I.—Malleable Iron.
S. C.—Steel Casting.
Br.—Brass.

For all other material print the full name.

Finish.—Indicate finished surfaces of castings by a black f. The cross of the f should be on the line representing the surface to be finished. See Fig. 2.

In case a piece is finished all over, mark "finish all over" in black ink below the title of the piece.

Screw Threads.—Use the conventional method for representing screw threads except in the case of square threads. With the exception of V threads, always give character of thread. See Fig. 1.

When other than standard threads are used, the threads per inch should be given thus: 16 P. I. When a thread is left-hand always call attention to the fact by note.

Notes.—When notes are used in connection with the drawing, join the note and the part to which it refers by a wavy black line with an arrow head at the drawing extremity. See Fig. 2.

Section Lines.—Make section lines as shown in Fig. 2, making distance between lines in proportion to the area sectioned.

Bolt Lists.—For standard bolts, nuts, set screws, machine screws, split pins, etc., do not make detail drawings, but use bolt list.

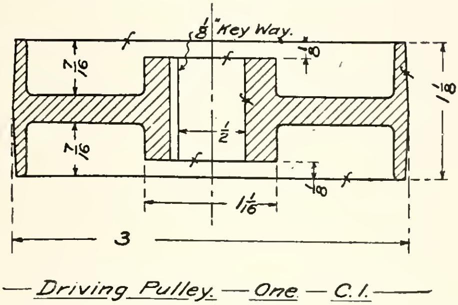


FIG. 2. SAMPLE DRAWING TO ILLUSTRATE DETAILS.

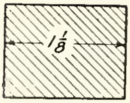


FIG. 3.

Dimensions.—Make figures to read from the bottom and right of the drawing as you face it. Place them, if possible, so they can be erased without touching a line of the drawing. When a dimension comes in a sectioned area, break the section lines as shown in Fig. 3.

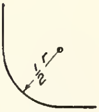


FIG. 4.

Give dimensions over all as well as sub-dimensions. Stagger sub-dimension lines as shown in Fig. 1.

Give radial dimensions as shown in Fig. 4. Use arrowhead at one end and denote center by o.

For all dimensions up to and including 24″, gives dimensions in inches; above 24″, in feet and inches. When all dimensions are in inches, the ″ marks may be omitted. When dimensions are in feet and inches, use the ′ and ″ marks and divide them by a dash, thus: 3′—5¼.″

Give dimensions to center lines and finished surfaces.

Keep dimensions on one view if possible, but figure to full in preference to dotted lines.

Do not repeat dimensions.

When giving angular dimensions, give the degrees to which the planer head will have to be set to do the work. Use the abbreviation deg. instead of the degree mark.

Thought.—Think of the men who are to use the drawing and make it *for them.*

Keep in mind the machines used in manufacturing the several parts; this will in a measure determine your dimensions.

During the winter lectures are given on drafting room conventions, blueprinting, drafting-room practice, relation of drafting room to the shop, etc.

As will be seen from the synopsis at the beginning of this article, the course in drawing is a three-years course. At its close or upon completion of the required amount of work, a diploma is granted the pupil stating that he has completed the full course in mechanical drawing. The course is long and not easy, and these facts alone make the diploma of practical value.

CASTINGS—MADE BY PUPILS IN THE FOUNDRY DEPARTMENT FOR THEIR USE THE FOLLOWING TERM IN THE MACHINE SHOP. MANUAL TRAINING HIGH SCHOOL, INDIANAPOLIS.

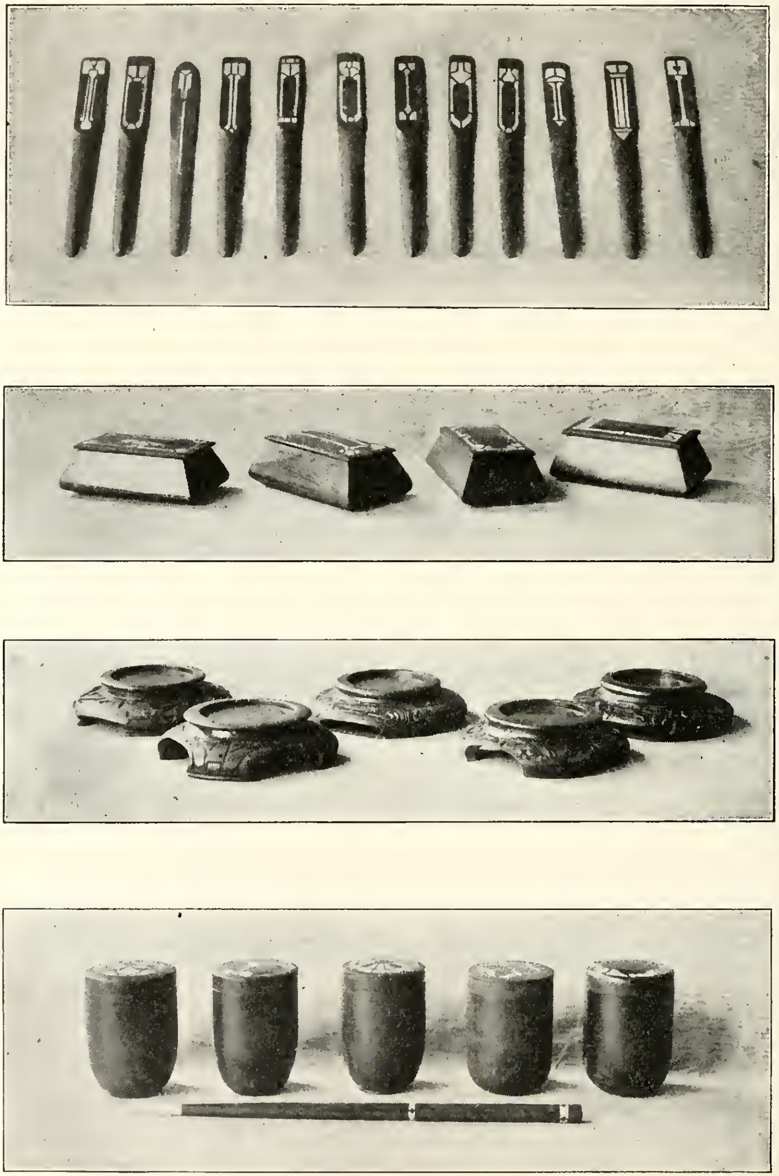
DESIGN IN THE MANUAL TRAINING HIGH SCHOOL.

Robert A. Kissack.

DESIGN as applied to shopwork has been successfully taught in the seventh and eighth grades. But in the secondary school, the manual training high school, or the technical high school, design has had very little attention. This has been due to a misunderstanding as to the function, not of "art," but of design in the curriculum of the technical school.

If the course of study of any manual training school is considered, there is usually found no attempt made to embody a *course* of design with the course in shopwork. In the woodworking shop a series of joints or models is given, and a final project "designed" by being taken from some outside source. Not that there is any impropriety in working from the designs of others—in fact it is difficult to see how an appreciation of good design can be cultivated without study of the best designs—the fault lies, first, in neglecting to impress the fact that nothing can be made without having been designed; and second, in the mistaken idea that a pupil can, in a moment, without previous training, design an adequate piece of construction. In the machine shop no such anachronism exists, for who tries to teach machine practice without study of machine design? But it would be better to make no attempt at designing unless its principles are studied in a proper manner. This can not be done unless the proper amount of time is given to it, and this lack of time is the principal reason for the absence of a course of design in the manual training school.

However, the course in shopwork has usually an equivalent amount of time given to mechanical drawing. In this mechanical drawing course, an appreciable, detached portion is given to freehand drawing, which, while of abstract educational value, has usually no relation to the shopwork. If this time spent in freehand drawing were divided and spaced thruout the first three years of the course, an adequate course of design could be arranged that would be logically sequential and in every way worth while. There is another point worth considering. With the excellent work done in many of the eighth grade woodworking shops, it is often a problem what to include in an advanced course of benchwork in the high school. Insistence can be placed on more accuracy and



WORK OF PUPILS IN YEATMAN HIGH SCHOOL, SAINT LOUIS.

more elaborate joinery than has been possible in the lower grades, but with a course of design properly adjusted to the varied requirements, a decidedly advanced course in woodwork can be arranged.

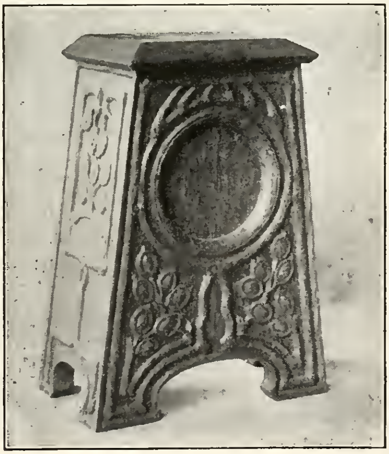
First of all, a series of models should be used that are good in form, line and proportion. In the beginning of the first year, applied design only should be attempted. The first principles of "spotting" can be applied to the models by inlaying. This can be followed by carving, to carry out the next step in designing. During the latter half of the first year, constructive design can be taken up. This can best be done by starting with the study of reproductions of the best furniture and cabinet makers.

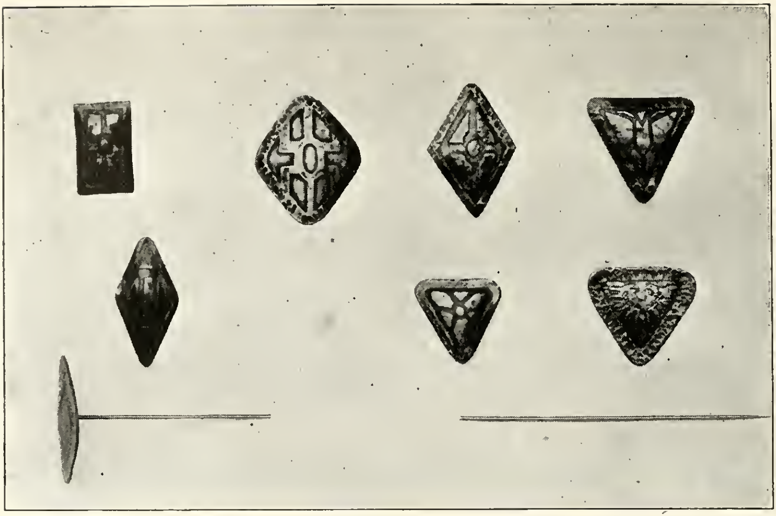
In wood-turning constructive design can be used for all models. In pattern-making and molding, in addition to the regular machine patterns, a series of patterns of key escutcheons, door-plates and various pieces of small building hardware can be made, which gives splendid practice in design as well as a proper study of alloys in their casting.

In forging, the opportunities for constructive design are practically limitless. The processes are comparatively few, and designs, whether of tool or other object, should play a dominant part. In the machine shop, machine practice and machine design are inseparable.

There is no reason to suggest here a course in design. It is merely desired to show how such a course can be incorporated with the present courses of study.

The illustrations show the result of such an attempt.





HAT PINS.

METALWORK—WITH INEXPENSIVE EQUIPMENT FOR THE GRAMMAR AND HIGH SCHOOLS.[1]

ARTHUR F. PAYNE.

WE hear and read a great deal nowadays about the correlation of design with handwork and manual training. We all know and admit that it is necessary and good, but how are we to do it and what materials shall we do it with? We know that in beginning woodwork it is all the student can do to master the tools and processes. Leather work is a subject that does not present enough technical difficulties. Pottery is very good, but how shall we do our firing and glazing unless we have an expensive kiln?, and think of the discouragement to pupil and teacher when a prized piece is broken.

So we turn to the working of copper, silver, and brass, which correlates perfectly with design, line and form, a subject almost inexhaustible in processes and technic; none of its processes is so difficult but that the painstaking student may master them. The element of interest also enters very largely into it by the making of articles for personal use and adornment, for the home, and for the school.

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[1] Copyright, 1910, by Arthur F. Payne.

One of the simplest and most interesting processes in sheet metal-working is that of etching. It requires very simple equipment and will show to the student the value of careful painstaking work. Of the many articles that can be made by this process, I will choose for a description of tools and processes the making of a

WATCH FOB OR BAG-TAG.

The materials and equipment needed are:

1 piece of soft copper or brass 18-gage (Brown-Sharpe gage); a piece 12 in. by 12 in. costs about 50 cents.

THESE TOOLS ARE ALL THAT ARE NECESSARY TO MAKE THE WORK SHOWN IN THE PHOTOGRAPHS.

Black asphaltum varnish, 10 cents. If you cannot obtain the varnish get a small can of Sapolin, commonly called stove-pipe enamel, 15 cents.

Turpentine to thin the varnish, or benzine to thin the Sapolin, 10 cents.

No. 2 water color brush, 5 cents.

Nitric acid, 10 cents.

1 piece of carbon paper, 5 cents.

1 machinist's ball pein hammer, ¾ lb., 60 cents.

Banana oil, 10 cents.

Potassium sulphide, 10 cents.

1 pair tinner's shears, 10 inches long, $1.00.

1 small chisel, 10 cents.

1 block of wood.

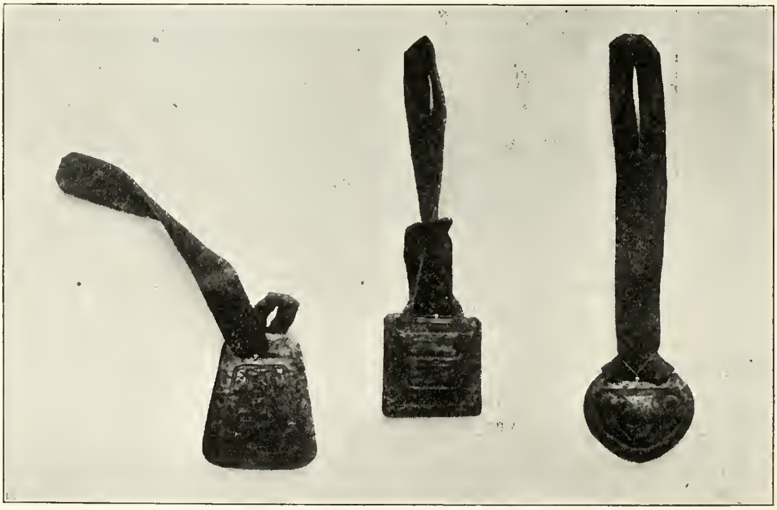
1 shallow dish, to hold acid solution, 10 cents.

Leather for the strap of the fob or tag when finished.

All the necessary tools are shown in the illustration and would cost about $2.00.

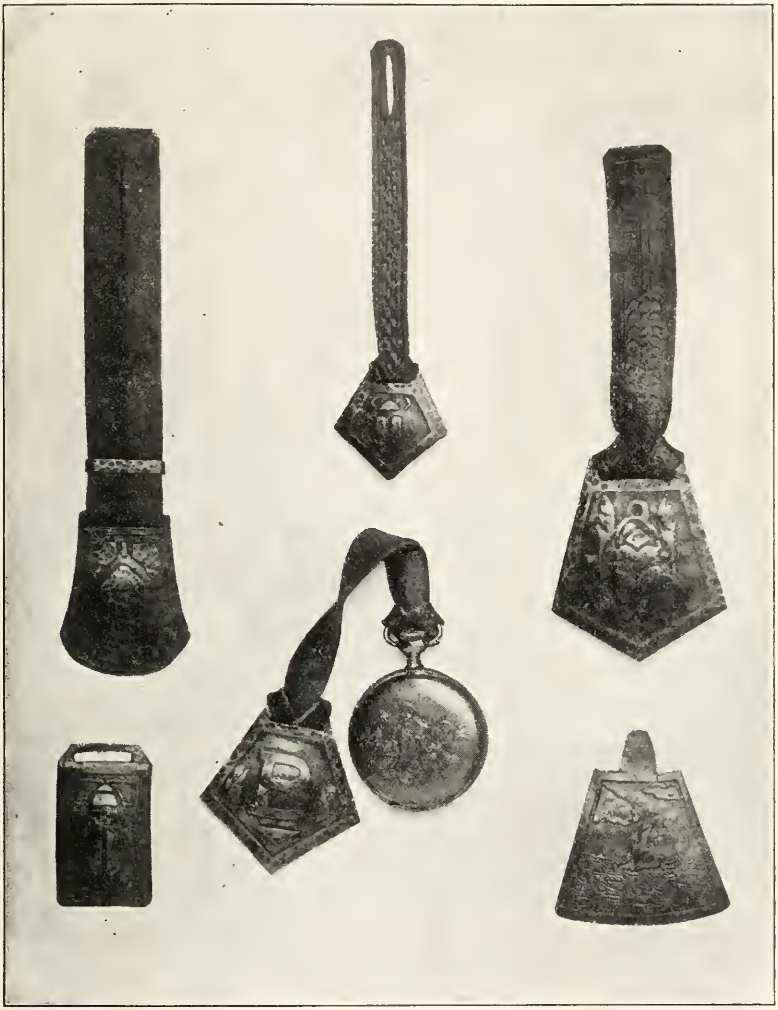
Having all our tools and materials, the next thing we need is the design. For the bag-tag, the best design would be a simple monogram, similar to those shown in the drawing, remembering always to have the initial of the surname the most prominent. For the watch fob we may use either the monogram or a conventional spot design similar to those in the photograph, remembering in all cases that in etching it is better when the design is the raised part and the background is eaten away by the acid, also that the edge of the article, whatever it may be, should always be left the full thickness of the metal, as may be seen by the illustration.

Next cut off a piece of metal a little larger than the design and transfer the design to the metal by placing the shiny side of the carbon paper next to the metal and then placing the design over it and tracing the design carefully all over with a hard pencil; then remove the paper



7 8 9

WATCH FOBS.



1 2 3
4 5 6

WATCH FOBS.

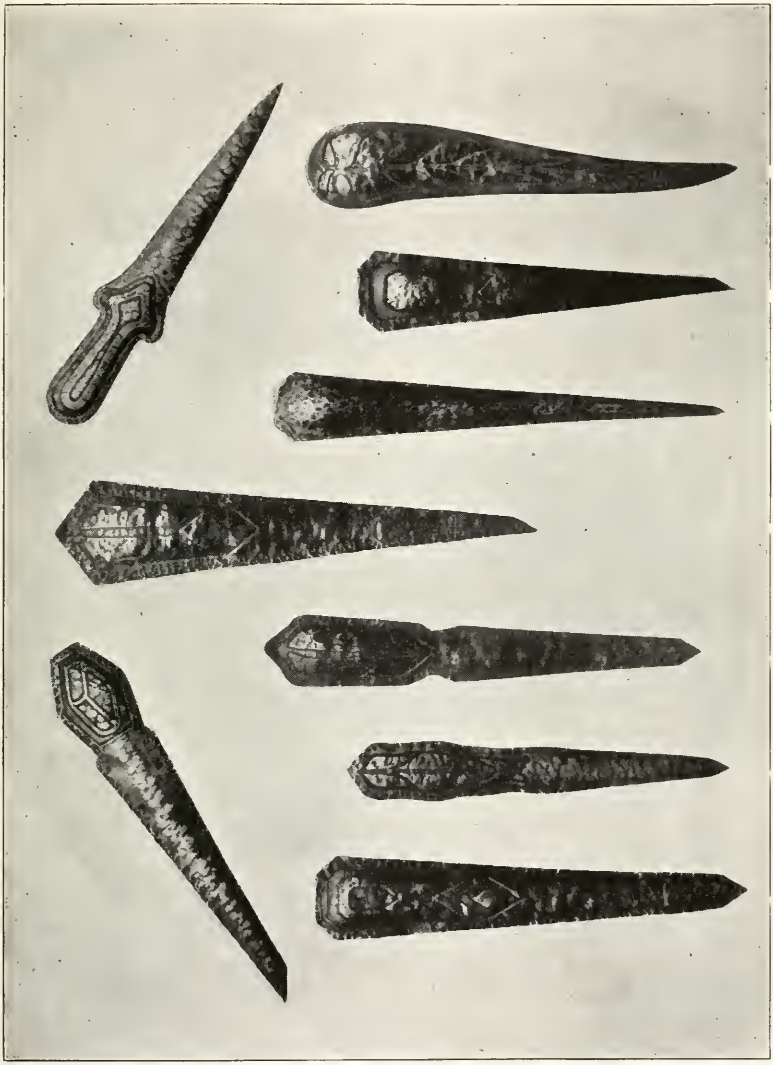
and the design will be seen on the metal. If the design does not show clear, as sometimes happens when the carbon paper is old, warm the carbon paper slightly before using. Now place in a small saucer or butter dish a very little of the sapolin or asphaltum varnish, thinning if necessary with the benzine or turpentine, and with the No. 2 water color brush carefully paint the design as shown in the drawing. Be sure also to paint the back of the fob, remembering that wherever the metal is left bare, it will be eaten away by the acid. Now lay aside to dry, which will take from fifteen minutes to two hours, according to the condition of the varnish. The drying of the varnish, however, may be hastened by laying the fob in a warm place.

We have now to prepare the acid solution for the real etching in a rather shallow stoneware or glass dish. Mix the solution of one-third nitric acid and two-thirds water, and when the varnish on the fob is dry place it in the acid solution. If conditions are right, the acid after a few minutes will commence to etch or eat away the metal that has been left bare. This can be told by the very small bubbles rising from the bare metal. If after five minutes' immersion in the solution the bubbles do not rise, pour in a little more acid. Sometimes it happens that the acid is fresh and strong and will etch too fast. This can be told by the large bubbles rising very fast, giving the acid almost the appearance of boiling. It also throws off strong yellow fumes. When this occurs weaken the acid by pouring in more water.

After it is etched deep enough, which will take anywhere from thirty minutes to three hours, according to the strength of the acid, take the fob out of the acid and remove the varnish by either scraping it off with a scrap of copper or soak for about half an hour in turpentine, when it will readily wipe off, and cut off the surplus metal with tinner's shears.

The design now looks flat and uninteresting, so beat up the design from the back by placing the fob face downwards on a block of wood and striking it with the ball end of the hammer. When there is a decided center of interest in the design, as in Nos. 1, 2, 4, 5, 9, beat that up higher making it more prominent, If the hammered effect is desired, hammer the edges and the design with the ball end of the hammer on a ball shaped piece of iron or on the ball end of another hammer. This also stiffens the metal and makes it hard to bend.

Now we have to deal with the problem of fastening the leather to the fob. There are two ways of doing this, as shown in Nos. 6 and 4 in the photograph. No. 6 has simply a piece left on the fob and bent backwards into a hook, as shown in the drawing, then passed thru a small slit in the leather and hammered flat. The second and best way is shown in No. 4, which is to cut out a small slit in the metal with the small chisel on the block of wood and file smooth with the small flat file. An easier but much slower way to get the slit in is this: After the design is etched deep enough, remove from the acid and dry, then paint all over the metal, leaving bare the slit, place back in the acid and let it remain until the acid eats clear thru. There is another method—that of sawing out with a jeweler's saw—but on account of the cost of the tools and breakage of saws we will not consider that method at the present time.



PAPER KNIVES.

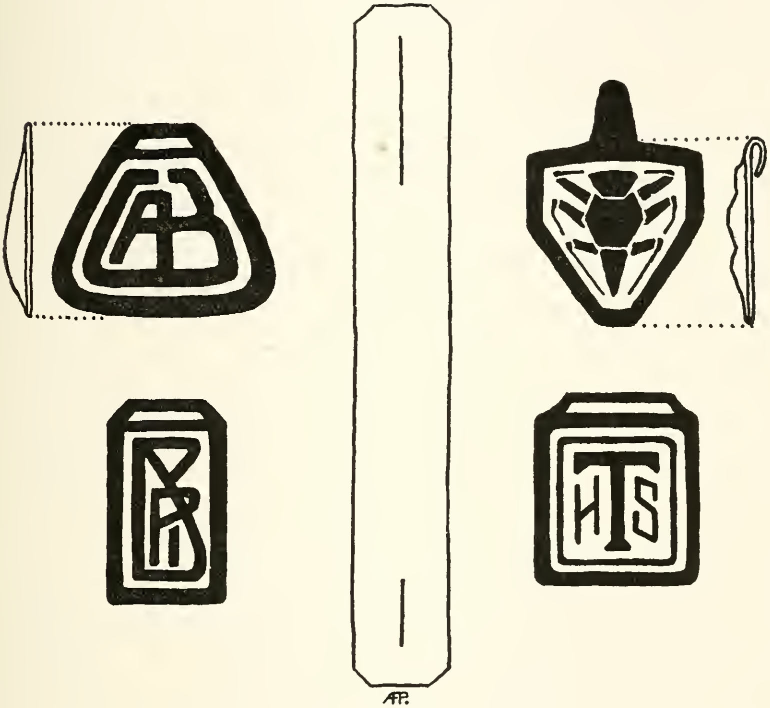
After the fob is etched, shaped, hammered, and the slit cut in, we have next to color and finish it. In coloring copper, we can get all the shades of color from light brown to black with a solution of potassium sulphide and water. It is not practical to give exact proportions for this solution, as the sulphide deteriorates with age and exposure to the air. However, the simplest method is the following: In one-half pint of water dissolve a piece of potassium sulphide as large as an English walnut. This, when rubbed on the copper, will turn it almost black. If you wish a lighter shade, mix a little of this solution with water, varying the proportions according to the color you wish to get. When it is dry, polish lightly with fine emery cloth, bringing the design out in bright copper color and leaving the background darker, then flow on the fob a thin coating of the banana oil and allow that to dry thoroly, which will take about three hours, and it is ready for the leather strap. If the fob is of brass use exactly the same method but instead of potassium sulphide use butter of antimony, full strength. If the fob is of silver, use the potassium sulphide but do not use the banana oil.

If you wish to color either the brass or copper verde or green, flow on with a brush the following solution:

Copper nitrate	16 grains.
Ammonia chloride	16 grains.
Calcium chloride	16 grains.
Water	1 oz.

Allow to dry and finish as before. A quicker method, altho not quite so good, is to mix verdigris with banana oil to the consistency of cream and apply with a brush. When it is dry rub the design with a cloth soaked in banana oil, which will relieve and bring out the design.

For the leather strap, get a piece of leather five inches long and as wide as the slit in the fob. Ooze sheep or calf skin will do, but if you wish to do the simple tooling such as is shown on No. 2 and No. 3 in the photograph, you should use Russian calf skin. Then in the end that fastens to the fob cut a slit one-half inch long as shown in the drawing and fasten to the fob by the method shown in Nos. 7, 8, 9, in the photograph. Another way of fastening is shown on No. 1 in the photograph, which is accomplished as follows: Cut the strip of metal one-eighth inch wide and twice as long as the strap is wide. Color and finish the same as the fob and pass the strap thru the slit in the fob. Then bend the small strip of metal around the two thicknesses of leather and hammer down the ends. To fasten to the watch cut a slit in the end of the leather as shown just long enough for the fob to pass thru and fasten as shown in No. 5.



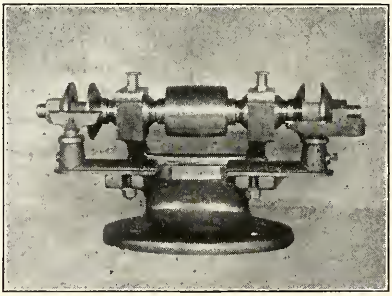
Hat pins, tie pins, belt pins and cuff links may be made by exactly the same method of etching and finishing as I have described but with this difference, that before they are colored the pin stems and link backs must be soldered on. These may be obtained from any local jeweler or from the Frost Arts & Crafts Workshop, 28 Cedar Avenue, Dayton, Ohio, for a few cents each.

To solder them on is a simple matter after a few trials. First clean with emery cloth the place where the pin is to be soldered and rub on both the back and the pin a few drops of a solution of three parts glycerine and one part muriatic acid; place under the cap that comes on the end of the pin stems a small piece of soft solder and hold both over the flame of a gas burner or alcohol lamp and the solder will melt and run, fastening the two together. Then color and finish as before.

Paper knives may be made with the same tools and by the same processes, being careful to hammer them with the ball end of the hammer on the block of wood and raise a slight ridge down the center—this will stiffen them. The ridge can be plainly seen on Nos. 1, 3, and 6 in the photograph. No. 6 is not etched—simply a piece of copper cut out and shaped and hammered. The others are etched by the same method as the fob.

In this, and the succeeding articles, the idea of the writer is to present, in logical sequence, a series of problems in metalwork, in which, while the processes and tool requirements will be simplified as much as is possible, the chief characteristics of metalwork, namely, rigidity and durability, will in no wise be sacrificed.

(*To be continued.*)



EMERY GRINDER, MADE FOR FOUNDRY DEPARTMENT BY BOYS IN MACHINE SHOP, MANUAL TRAINING HIGH SCHOOL, INDIANAPOLIS.

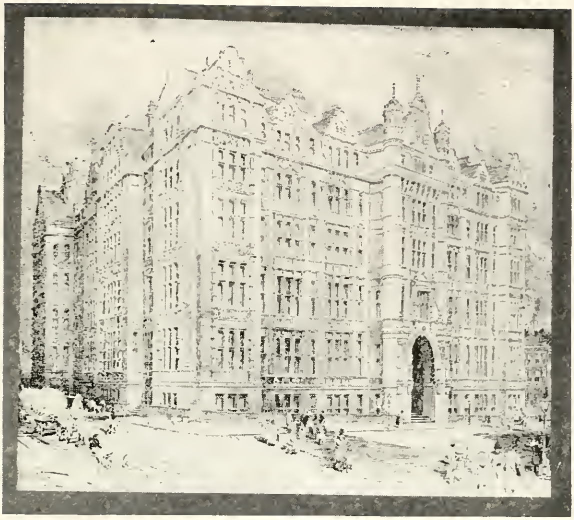


FIG. 46. MUNICIPAL SCHOOL OF TECHNOLOGY, MANCHESTER.

VISITING MANUAL TRAINING SCHOOLS IN EUROPE.

IV.—MANCHESTER AND LEEDS.

CHARLES A. BENNETT.

AN afternoon ride thru the picturesque hill-tops of the Peak country brought me to the metropolis of the Midlands, the busy, manfacturing city of Manchester. Before leaving Leicester I had received a felicitous letter from J. H. Judd, the superintendent of handicraft in Manchester, and an invitation to attend the February meeting of the Manchester Branch of the National Association of Manual Training Teachers. This meeting was held in the Municipal School of Technology, Fig. 46, and proved to be well worth attending. The subject for discussion was "Inspectors, Organizers and Teachers, or Ethics in the Manual Training Room." John Arrowsmith of Halifax, the leading speaker, treated His Majesty's inspector generically, painting him in varying tones of blue—some of them rather deep. The skill of the artist was marked, and he kept his audience alert with crisp bits of psychological wisdom and humorous personal experiences. All who took part in the discussion seemed to be emphatic in their belief that instead of being a "glorified policeman," an inspector should be a friendly adviser. "We ought to be able to welcome the inspector because he is a helper. His work should be to help us in solving our knotty problems."

At the close of the session I met several officers and members of the Association who urged me to join them at dinner. As we spent the next hour together I was impressed with their good fellowship and the fine quality of their hospitality. I was not "a stranger in a strange land," but a fellow teacher welcome in the mother country.

The next day I spent with Mr. Judd visiting manual training centers. In Manchester manual training is given to the boys of the fifth, sixth and seventh standards, and in six schools systematic handwork has been extended downward to include all the lower standards. In the three upper standards there are 10,500 boys. Mr. Judd's staff of special teachers now numbers 49. There are two schemes of woodworking in use in Manchester. The older one is in many respects similar to others found in English cities. It is a graded series of exercise pieces and useful models intended to teach the fundamentals of benchwork. Accompanying this course in woodworking is a course in drawing. The scheme for each of the three years has been worked out in much detail with respect to aim, methods, and the informational lessons which accompany the instruction in the use of the tools. During the months of May, June or July and sometimes in January, teachers are required to take their classes to the nearest park or well-wooded district where trees may be closely examined and their chief characteristics pointed out. Notes on such lessons are taken by each pupil, from which a detailed description is written at the time of the next lesson in the manual training center. Fig. 47 shows a class from the St. Mary's Road School taking notes.

"LEARN BY DOING" SCHEME OF WOODWORK.

The later scheme of woodwork instruction is the one that especially distinguishes the work in Manchester from that in other cities. This is known as the "Learn by Doing" scheme and was published in book form in 1906. In devising this scheme Mr. Judd aimed[1]

(a) To reduce the cost of equipment by at least seventy-five per cent.

(b) To adapt the work to the requirements of all classes of schools and all ages of children.

(c) To devise work capable of being taught by teachers of both sexes without prolonged training.

(d) To educate by developing the natural aptitudes of the children.

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[1] See "A New Scheme of Handicraft," by J. H. Judd, The Practical Teachers' Art Monthly, May, 1907.

He began his experiments with a class of ten mentally defective children who were incapable of reading ordinary measurements, or of drawing a line in a given direction. From these he worked along up in the scale of mentality until he had found satisfactory problems for all the standards. This series forms the basis of the scheme, "but the child itself," says Mr. Judd in an article in the May, 1906, number of *The Manual Training Teacher,* "is the chief inventor, and the teacher must catch hold of and develop the crude ideas of the children."

FIG. 47. TAKING NOTES ON TREES, MANCHESTER.

As is clearly shown in Figs. 48 and 49 the scheme involves much construction work and for that reason makes a strong appeal to the interest of the younger boys. Most of the material is given to the pupils in strips ready to be cut to proper lengths for fastening together.

The equipment for this work may be either the inexpensive school-desk outfit shown in Fig. 50 or a full benchwork equipment. Both are used in Manchester. In the desk outfit one notices the work board with a double thumb-screw vise at the front, the small wooden plane made especially for this work, and the round-handled back-saw. The pieces of wood at the right in Fig. 50 show the sizes in which stock is usually furnished. Fig. 51 shows the case in which the work boards and tools are kept. The upper part is used for materials or kept for a display of models. At the Oswald Road Center the woodworking room has no

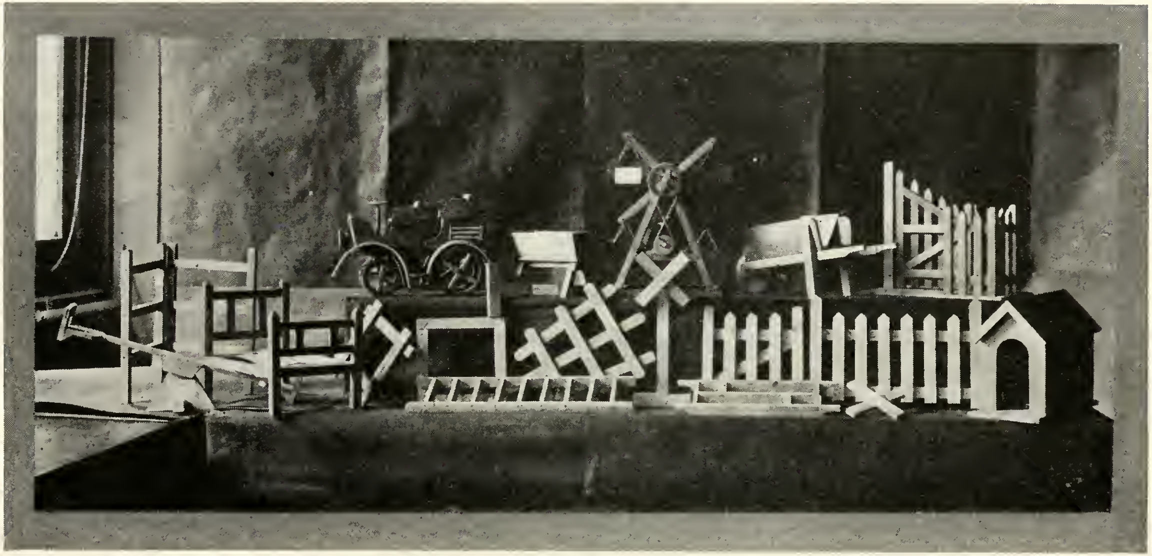

FIG. 48. "LEARN BY DOING" MODELS, MANCHESTER.

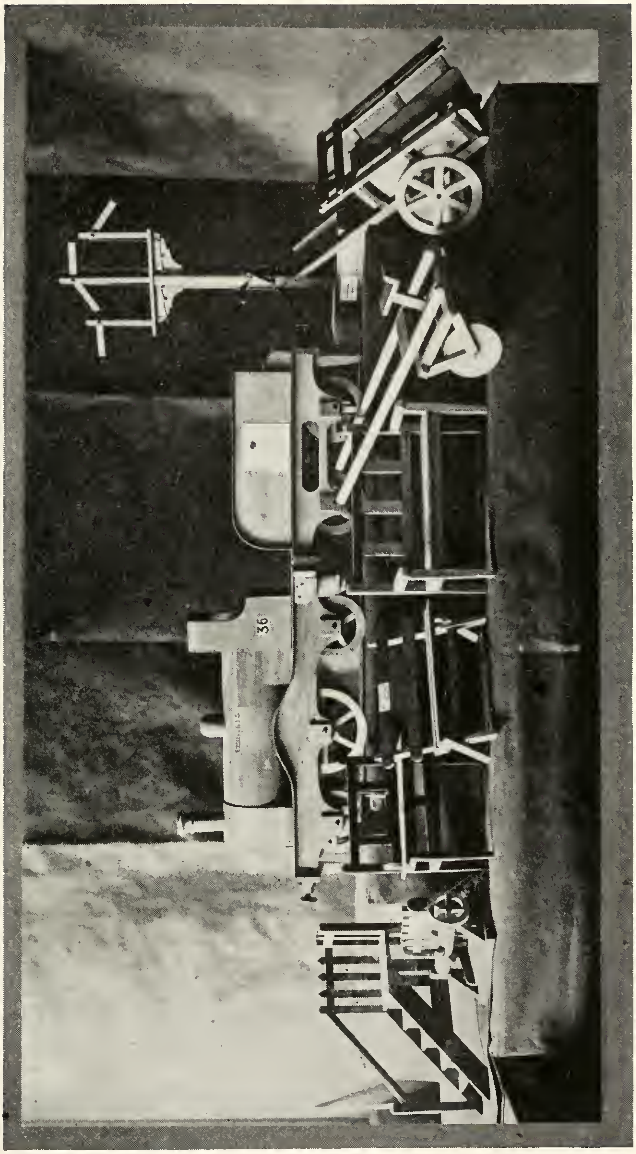

FIG. 49. "LEARN BY DOING" MODELS, MANCHESTER.

benches, but is equipped with ordinary school desks, Fig. 52, and work boards. Here I saw a class of boys intensely interested in their work. Five other centers are equipped in a similar way.

The merits of the "Learn by Doing" course have become so apparent because of the interest it arouses in the children that four of the teachers with the regular benchwork equipments have elected to teach the new course instead of the old even to boys in the seventh standard. A class working in one of these centers is shown in Fig. 53. It is noticeable that in this center school desks are provided where pupils do their work in drawing. The teacher in this room told me that the new course was harder to teach than the old one, but he preferred to teach it because the children were so much more interested in it and put forth their best efforts all the time.

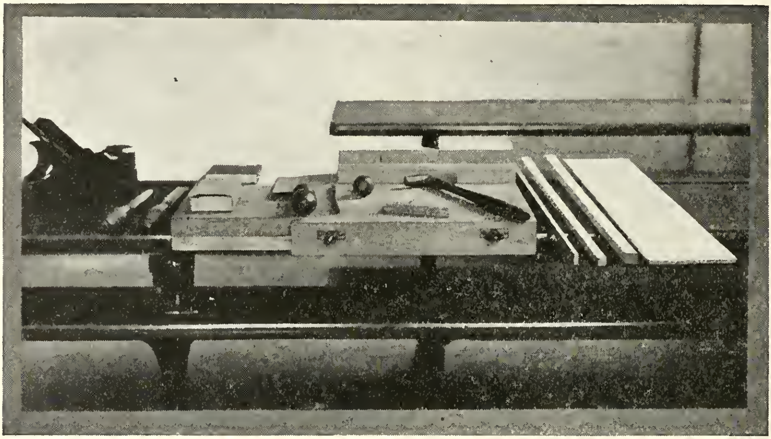

FIG. 50. WORK BOARD AND TOOLS FOR "LEARN BY DOING" COURSE.

As an illustration of the way the models made in this course are sometimes used, I give Fig. 54, which was taken in an infant school. The boys of the upper standards had made sections of fence and put them together to represent a playground. Then they contributed a swing, a merry-go-round, a truck, parallel bars, seats, chairs, etc., much to the delight of the little tots.

As I went from school to school with Mr. Judd I asked questions which brought out many interesting facts concerning the early history of manual training in England. I found that Mr. Judd himself had been a teacher of manual training dating back almost to the beginning of the movement. In 1888 he gave up engineering, in which he had been engaged for about fifteen years, in order to become the first teacher in the York Place Technical and Manual Instruction School in Brighton, the pioneer manual training school in the south of England. He continued in the work at Brighton until 1897 when he accepted the superintendency of the handicraft instruction in Manchester. Mr. Judd was the first teacher in England to establish training classes for teachers of manual training. During the three years from 1889 to 1891 inclusive about one hundred teachers were trained by him and sent to various educational bodies wishing to establish manual training.

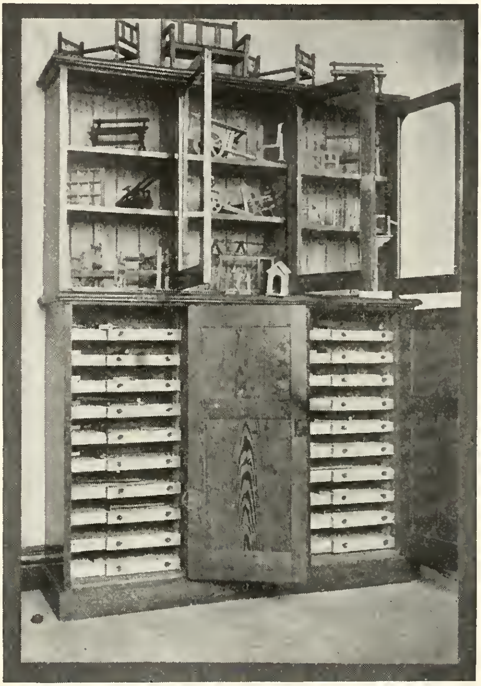

FIG. 51. CASE FOR KEEPING WORK BOARDS AND TOOLS.

TRAINING TEACHERS OF HANDICRAFT IN MANCHESTER.

I was considerably interested in the plan for training special teachers of handicraft in Manchester. In general it is the method of apprenticeship. It covers a period of two years, in which half of the time is spent in study and half in teaching under the guidance of experienced teachers. To qualify, all pupil-teacher candidates must pass an examination in algebra, geometry, history, geography, science, French, woodwork, drawing, and cardboard work. They must (a) be not less than sixteen years of age and not more than eighteen, must (b) produce satisfactory testimonials as to character and general aptitude for imparting knowl-

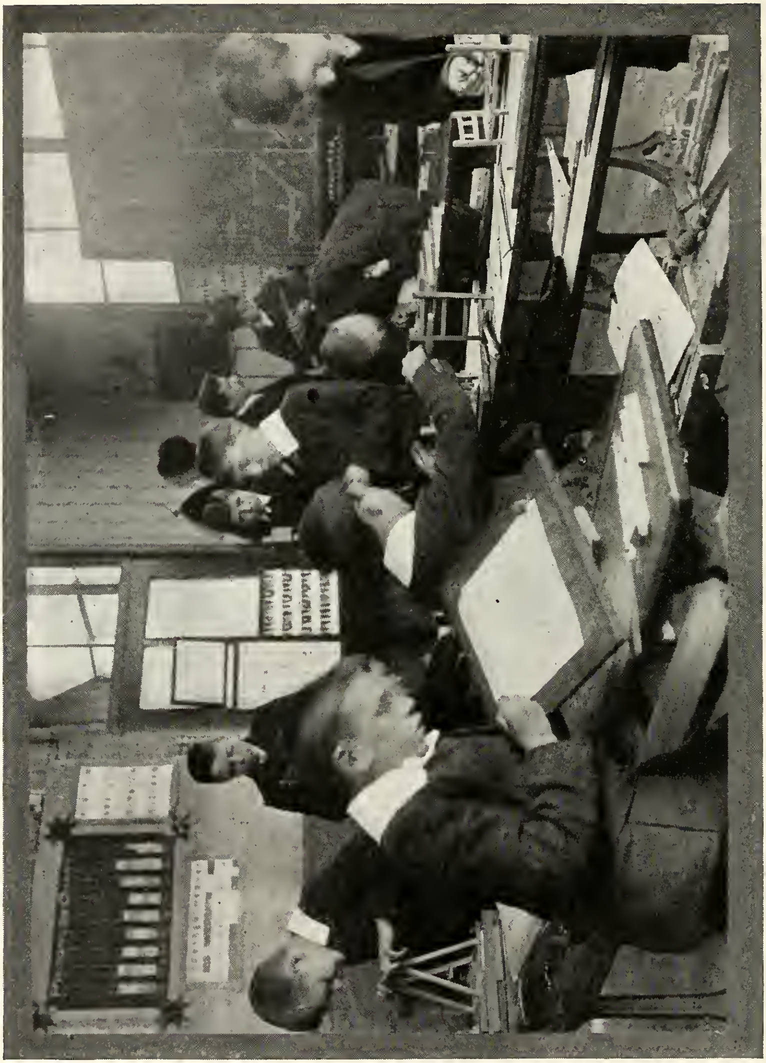

FIG. 52. OSWALD ROAD CENTER, MANCHESTER.

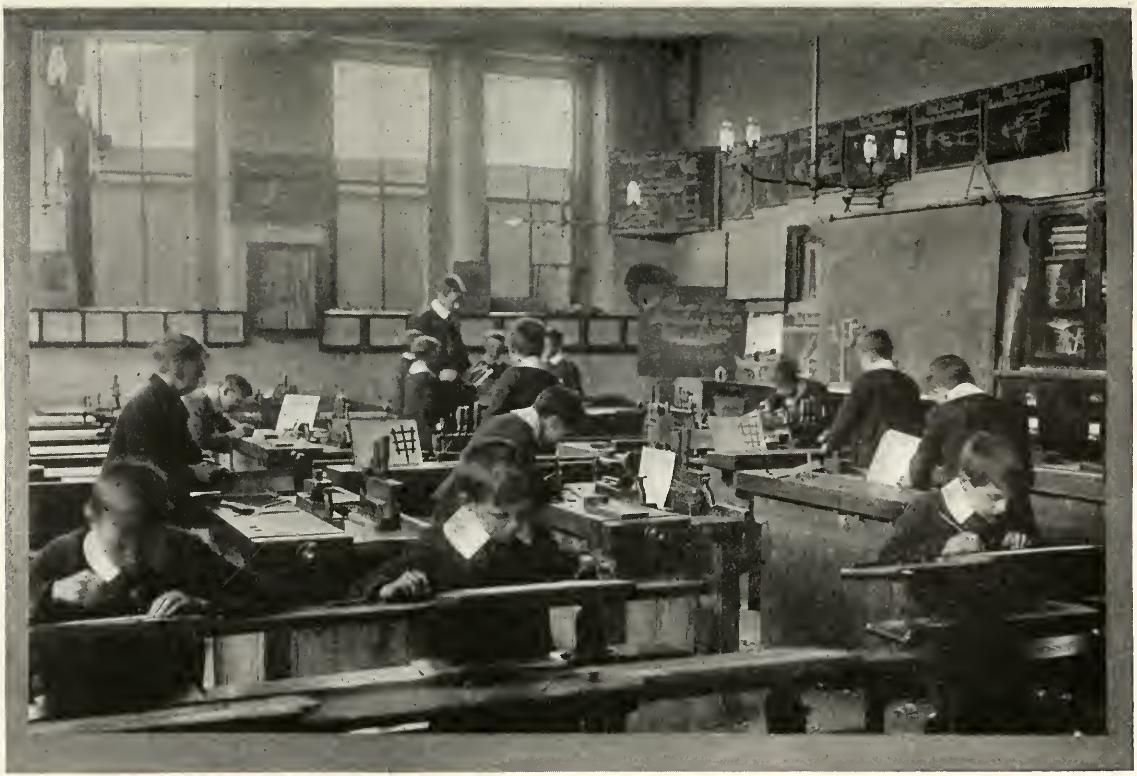

FIG. 53. "LEARN BY DOING" COURSE BEING TAUGHT WITH FULL BENCH EQUIPMENT, MANCHESTER.

edge, and special aptitude for handicraft and drawing, and must (c) satisfy the medical officers as to physical fitness for the work of teaching. During the period of apprenticeship each pupil teacher spends two half days at the Pupil Teachers' College, one half day at the Municipal School of Art, where he is a member of a special class for elementary school teachers, and one or two half days at the Municipal School of Technology, where he pursues the engineering apprenticeship course.

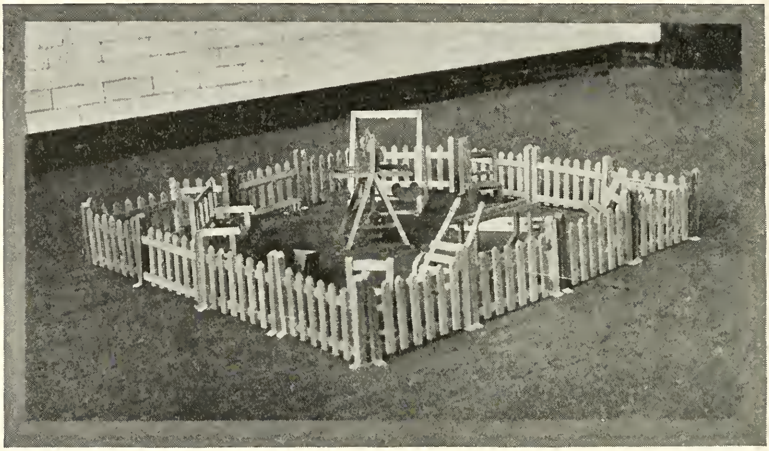

FIG. 54. PLAYGROUND IN INFANT SCHOOL MADE WITH "LEARN BY DOING" MODELS.

During the three years following apprenticeship a teacher of handicraft must secure the teacher's certificate in manual training (woodwork) of the City and Guilds of London Institute.

The schedule of salaries is as follows:

Pupil teacher of handicraft, first year,	$135.00.
Pupil teacher of handicraft, second year,	$137.50.
Junior assistant of handicraft, first year,	$275.00.
Junior assistant of handicraft, second year,	$300.00
Junior assistant of handicraft, third year,	$325.00.

At the end of these five years, if the qualifying certificate has been obtained from the City and Guilds of London Institute, the salary is raised to $475 and increases by $25 annually to a maximum of $600 or such a sum as may be fixed by the Education Committee.

MANUAL TRAINING IN THE MANCHESTER GRAMMAR SCHOOL.

Before leaving Manchester I spent a profitable hour or two with F. W. Parrott and A. Ogden of the Manchester Grammar School. This school, founded in the sixteenth century, coresponds to one of our American endowed academies. It is, however, almost entirely a day school, drawing its pupils from a radius of thirty miles around Manchester. Tho it is a pay school, there are "160 foundation scholarships which give free tuition and make it possible for industrious and clever lads from the elementary schools to pass on thru the grammar school to the universities." It was encouraging to find in this type of school a thoroly modern equipment for benchwork in wood. The course of instruction reminded me of the courses in some of our best American high schools. I was surprised to learn that manual training had been taught in the school for twenty years. Tho not compulsory, the work is quite generally taken by boys of the lower forms. The instruction is entirely individual and the method, as stated by Mr. Ogden, may be summed up in the two words "Sympathetic suggestion."[2]

He says, "The conceptive attitude of the pupil is strengthened by the manner in which the exercises are presented, for it is only in the early stage of the work that blackboard drawings and sketches are supplied with definite dimensions. Later all the drawings are designed to convey an 'idea' which the boy places in the first state of the concrete by means of his drawing, and finally makes absolute in his model the conception first formed." In practice this method reduces to a number of problems which are freely interspersed between the usual exercise pieces or models. These problems are intended to foster self-reliance, correlate with physics and mathematics, and enable the teacher to help the pupil at his weakest point. The following are selected from the problems given:

Problem.—We have to build a bridge across a stream 12 ft. wide. Heavy traffic is to pass over our bridge, which is 6 ft. above water level. The material supplied is Canary wood, in strips 2 ft. long, ½-in. wide, and ¼-in. thick. Draw a plan and elevation, and make a model to a scale of 1 inch = 1 foot.

Problem.—A cubic inch of water at 62° Fahr., with the barometer at 30 inches, weighs 252.458 grains. I grain = 1-7000 of the lb. avoirdupois. Construct a box of good proportion, using the dovetail formula as the basis of construction. The wood supplied will have an area equal to ¾ of a square foot. The model to be preceded by an isometric projection to a scale of ⅞ in. = 1 in. State on your drawing the capacity of the box for holding water.

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[2] See "Manchester Grammar School," by A. Ogden, *Manual Training,* Nov., 1908.

Problem.—Which exercise, model, or problem do you like best? State reasons for the preference. Design and make a model, as an alternative, which gives the same tool practice. State the probable time the whole work will take to construct, and make a list of the wood required.

Problem.—Design a neat book-shelf. Assume that it is to be fixed upon a brick wall, and that nails are not allowed. How would you fix it in a desired position? Your drawing to be an orthographic projection. Show clearly the method of fixing, then make the model.

Problem.—In olden days, the Romans had an engine of war called a "Tormentum," which threw large stones with great force. Read up about this engine. Make a clear drawing, then a model. State on your drawing the mechanical principles involved in the hurling of stones.

Adjoining the Grammar School are the buildings of Chetham's Hospital and Library, "the most ancient and interesting in Manchester." This bluecoat school with the free library was founded in 1651 on the site of a college of earlier times. The library is said to be the oldest free library in Europe and the forerunner of our great system of public libraries. The buildings for both school and library were a delight to see, being so full of quaint and charming bits of Gothic architecture, but what interested me most was a little building leaning up against the rear wall of the kitchen, Fig. 55. It was a mere lean-to of modern construction, many feet below the main court, and wedged in between two buttresses of the ancient building. Here was the manual training shop that won the first public grant in England. It will be remembered that the Act of Parliament which made this grant possible was brought about largely thru the efforts of Sir William Mather, a manufacturer and distinguished citizen of Manchester.

Mr. Parrott introduced me to the teacher of manual training in this little building and he gave me permission to take the photographs, Figs. 56 and 57, which show the equipment in practically the same condition as when first installed, except for the wear on the benches. It was so late in the afternoon that the second picture was taken partly by daylight and partly by artificial light. It is noticeable that both woodworking and metalworking are taught in the same room.

A VISIT TO ROCHDALE.

Only a few miles out from Manchester is the city of Rochdale. Here I spent a pleasant Sunday afternoon at the home of J. W. Riley of the Municipal Technical School. John Arrowsmith of Halifax was there. Mr. Riley took us thru the rooms of the Technical School, also some places of historic interest in the city, and then we sat by an open grate fire in his home until Mrs. Riley announced that tea was ready. The delightful hospitality, the fine professional spirit, the opportunity to get close to these two men who are in the group that is molding manual training in England made the afternoon one to be remembered.

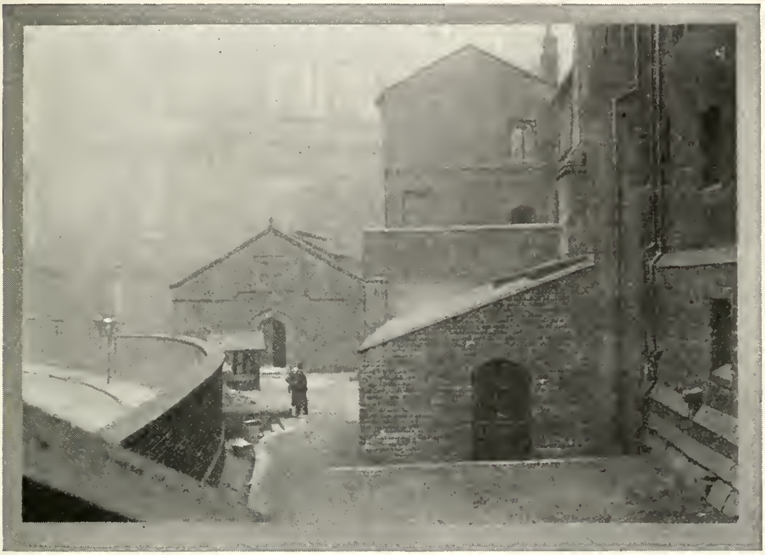


FIG. 55. MANUAL TRAINING SHOP, CHETHAM'S HOSPITAL, MANCHESTER. THE SHOP THAT WON THE FIRST PUBLIC GRANT IN ENGLAND.

American manual training teachers will recall the fact that Mr. Riley was one of the men who came to America in the Mosely party a few years ago. He is the principal of the Building Trades Department of the Technical School, which, in this case, includes the manual training. The course of instruction in this school is especially strong on the technical side.

In Rochdale, as elsewhere, I found myself greatly interested in all departments of the Technical School, with which is combined an art school. As mentioned in connection with the school at Leicester, each English technical school gives special emphasis to the local industry and the building trades. In Rochdale this local industry is textiles. Weaving, spinning, and dyeing are taught with the best of modern appliances. This same idea prevails in the world-famous Municipal Technical

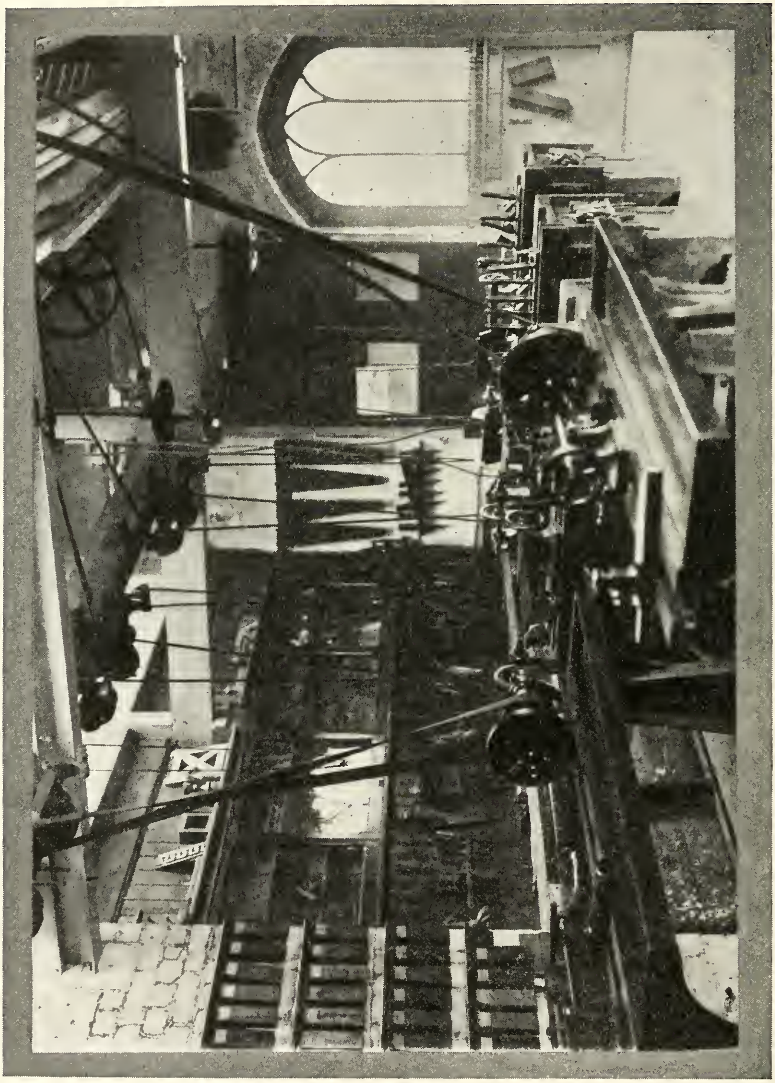


FIG. 56. MANUAL TRAINING SHOP, CHETHAM'S HOSPITAL, MANCHESTER.

School at Manchester under the principalship of J. H. Reynolds, where the textiles department is very extensive, tho in this school many industries are amply provided for.

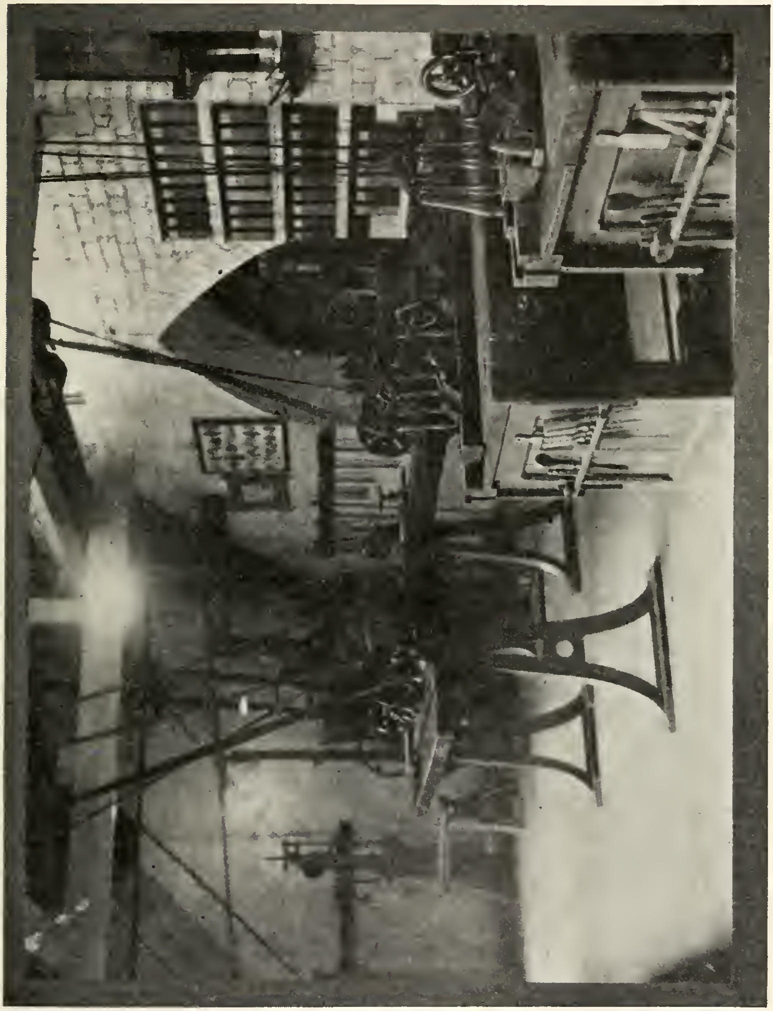


FIG. 57. MANUAL TRAINING SHOP, CHETHAM'S HOSPITAL, MANCHESTER.

While on my way from Berlin to Cologne I fell in with a German student, the son of a textiles manufacturer. He had been home for the holidays and was then on his way back to Manchester to continue his studies in the textiles department of the Technical School. He told me that there was one fine textiles school in Germany but that if a young man wished to get the best possible preparation for the textiles business he must surely study at the great English school. Besides the textiles some of the strongest departments of the Manchester school are mechanical engineering, electrical engineering, chemical technology, and photography and the printing crafts.

MANUAL TRAINING AT LEEDS.

From Manchester I went to Sheffield and from Sheffield to Leeds, the great textile city of Yorkshire. I met S. Bearder, the superintendent of handicraft, at the Education Office at 9:30 in the morning and from that time until I left for Scotland on the afternoon train I was being piloted by him from one school to another, so that I might gain as comprehensive a view of the system as possible in the short time I could stay in Leeds. One of the first and most important facts I gained from Mr. Bearder was that Leeds, unlike most cities in England, has manual training in all the grades of the elementary schools. Clay modeling is taught in the first and second standards, cardboard work in the third and fourth, except that the girls of the fourth take cooking instead of cardboard. Woodworking and mechanical drawing are given to the boys of the fifth, sixth, and seventh standards. Metalworking is taught in the high schools only. In the city there are twenty-six centers for woodwork and two for metalwork. Forty-five special teachers are employed. About 8,000 boys receive instruction in shopwork. There is a special school for the defectives. All pupils in the city receive instruction in some form of handicraft. This notable result is due in part, no doubt, to a liberal policy on the part of the Education Committee in Leeds, but it is also due to the fact that for fifteen years the work has been fully organized and running under the present superintendent. As I went from school to school the equipments did not seem essentially different from those I saw in other cities. I found well-lighted rooms, good tools and many charts and conveniences for teaching. At one end of the room at the Cross Flats Park School I saw a new kind of bench for use in getting out stock, Fig. 58, which pleased me. The boards were clamped in place at the right height for effective rip-sawing.

The course of instruction in Leeds is a development from the Swedish sloyd. In going from one school to another my conversation with Mr. Bearder led very easily to a discussion of the types of manual training

I had observed in the different English cities. Especially we spoke of the London type and the Nääs type, for one is quite sure to classify most of the woodworking in England under one of these two heads. I consider Mr. Bearder's liberal attitude quite significant. He said that after all, whether one system or the other was being followed was of little account in comparison with the quality of the teacher who was giving the instruction. "If I were to move to another city and were looking for a manual training school to which I might send my son, I would not ask which of the two systems was taught in the school, but first of all I would ask what kind of a teacher is to teach my boy if I send him to this school. Is he an educated man? Has he high ideals? Is he a manly man? Has he skill of hand and is he able to inspire my boy to become skilful? Does he understand boys?" The great problem of manual training in England as well as in America is not a problem of sequences and useful or non-useful models, but a problem of getting a high type of teacher.

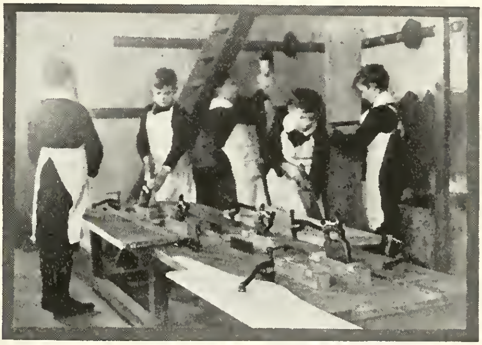


FIG. 58. BENCH FOR "GETTING OUT STOCK," CROSS FLATS PARK SCHOOL, LEEDS.

At the Central High School I met the principal, Dr. Forsyth, whose brother in California had much to do with building the American battleship Oregon, and he added emphasis to what Mr. Bearder had said. Dr. Forsyth said, "First we employed mechanics to teach the manual training and they, with their circumscribed experience were not good teachers; then we tried elementary school teachers, many of whom had not been successful in teaching the regular school subjects, and these

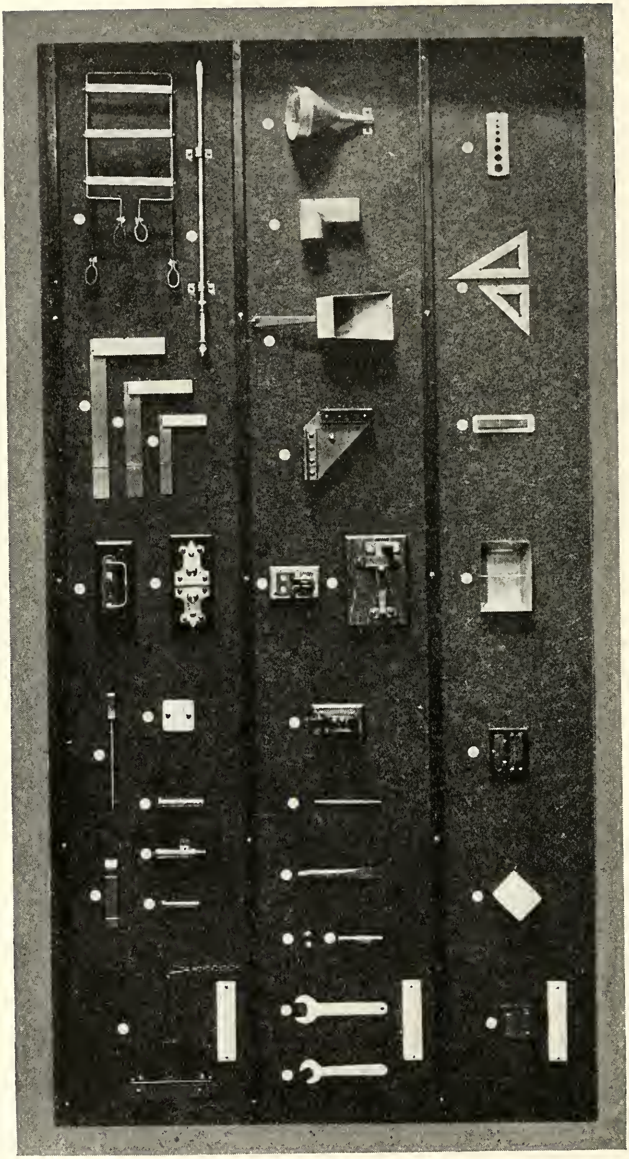


FIG. 59. COURSE IN METALWORK, COCKBURN HIGH SCHOOL, LEEDS.

were not satisfactory. Now we are looking for men who are both educated teachers and good mechanics."

In the Cockburn High School at Leeds I found some very interesting shopwork carried on under the direction of J. W. Richardson, a trained engineer and good mechanic. He was especially enthusiastic over metalwork, and as I too am especially interested in that subject, I asked him many questions. At the end of our conversation I was ready to admit that his course pleased me more than any I had ever seen for high school work in cold metals. It was practical from beginning to end, but in being so it did not omit art considerations, as is readily seen by referring to the bracket, the poker, the latch and the hinge in Fig. 59. In this course there appears to be a successful effort to adapt work to individual interests. If a student has no interest in engineering and cares nothing for the riveting problem, for instance, he is quite likely to be interested in the art crafts and so be especially glad to make the latch. Mr. Richardson serves the different types of boys by the use of "alternate models."

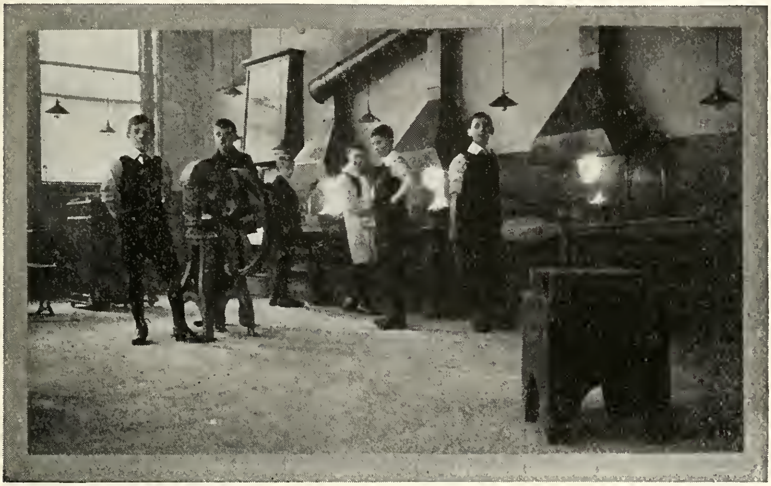


FIG. 60. FORGE SHOP, COCKBURN HIGH SCHOOL, LEEDS.

Fig. 60 is from a kodak picture taken in the forge shop of this school. To me the boys seemed very small compared with some of our prairie-grown boys of the same age and the fittings of the shop rather clumsy

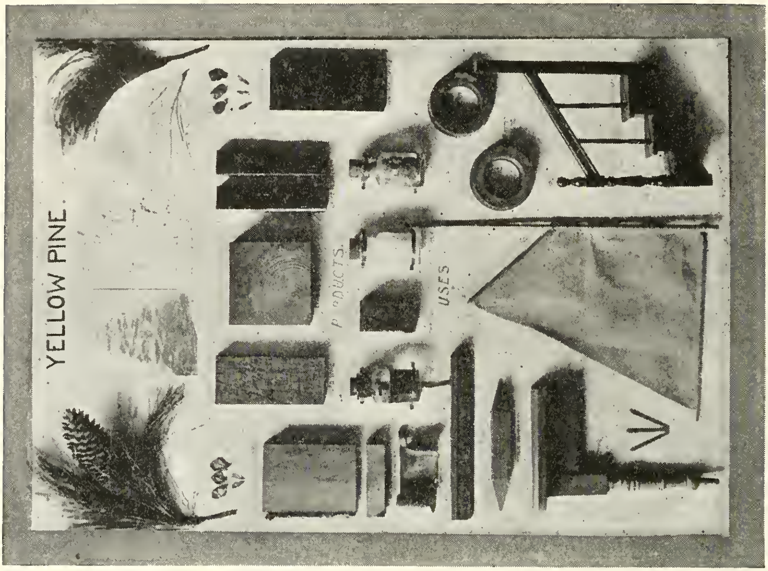

YELLOW PINE.
PRODUCTS.
USES.

FIG. 62. EXHIBIT OF YELLOW PINE WOOD AND ITS USE, COCKBURN HIGH SCHOOL, LEEDS.

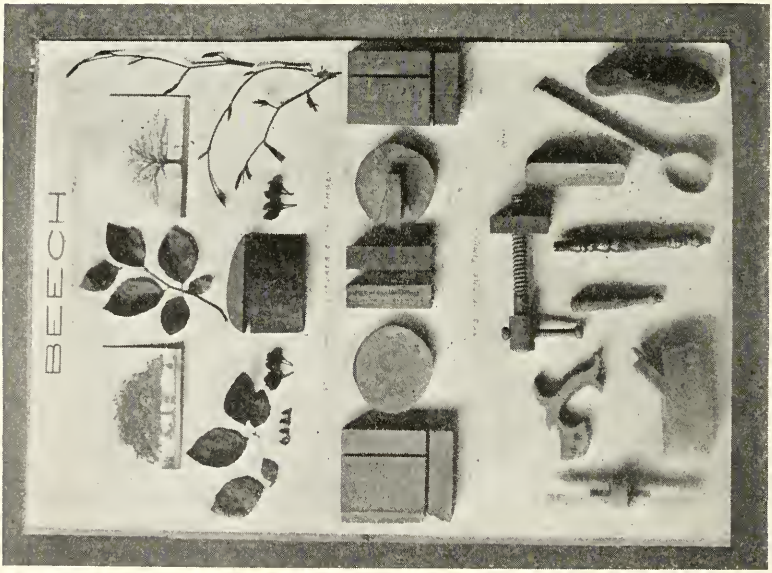


FIG. 61. EXHIBIT OF BEECH WOOD AND ITS USE, COCKBURN HIGH SCHOOL, LEEDS.

in comparison with our down-draft equipments, but the work being done was good.

In this same school I found a teacher of woodworking, Mr. Hamnett, who presented a point of view which was new to me in reference to teaching wood-turning. He does not believe in beginning with spindle turning as we do in America and as they do in France and Germany. He would give face-plate turning first because the holding of the tool is simpler and there is only one center to look after. He claims that center turning is taken up much easier after face-plate turning. He would begin by turning a disc, and from this, proceed in the development of a course.

Figs. 61 and 62 show two of several exhibits hung in the woodworking room to illustrate the characteristics, growth, cutting and use of timber trees.

When I left Leeds I realized that it was thru the planning and generous treatment of Mr. Bearder I had been able to compass so large an amount of work in a single day, but I regretted that I did not have time to spend several days in a detailed study of the work of the city.

(*To be continued.*)

FROM MASON CITY, IOWA, HIGH SCHOOL.

EDITORIAL

Differentiated Elementary Education. Industrial education is a problem forced upon us by changed and changing social and industrial conditions. It is not a question of whether we shall attempt to solve it but of how we shall solve it. The first important movement toward solution was a combined effort by educators, employers and employes, but the evident trend is toward the advancement of the cause thru the means of public education. It is a charge which the public schools will assume and eventually fulfill. But it is a serious query whether or not we are now approaching the problem from the wrong end. There is an analogy between our present attitude toward the problem of industrial education and the development of manual training in this country. Manual training began with the technical school, passed downward to the manual training high school, to the high school and to the grades, with the result that the pupils in the elementary schools made joints designed for students of the Imperial Technical School of Moscow, and even with the tremendous advancement of this department of public school work it has never seriously had a place as an integral part of our elementary school course of study. To the great majority of public school teachers to-day manual training is a thing to be endured rather than a means to be utilized. In like manner it is the trade school, the continuation school, the elementary industrial school with a purely utilitarian purpose that are being considered and projected, rather than the preparation of the material which they must use, the product of the established elementary schools. The danger lies in dealing with industrial education as apart from and added to the school system, instead of making it an integral part of that system by reorganization to meet social conditions. Modification, not revolution, is needed. Our elementary schools are good and have been—so far as they go. Their aim is simple and direct—preparation for higher education, and for life thru that medium. Elementary school courses have been developed almost entirely to this one end, apparently upon the assumption that all minds should be developed in the same way and that culture, refinement and power depend upon the standards which they have fixed. Of the appalling number of pupils lost to the schools in the lower grammar grades it is certain that a very large percentage fail, not because of lack of ability, but because their minds are appealed to by things that are concrete, by realities rather than images, whereas the work of the traditional school course is almost entirely abstract. It is from the large class of pupils of this type of mind that the highest grade of intelligent industrial workers should naturally come, and it is in this direction that the door of opportunity should be opened to pupils of the elementary schools. Their claim to special preparation is just as strong as that of the academic pupil who is amply provided for by the traditional elementary school course.

Differentiated Elementary Work in Cleveland. The Cleveland Elementary Industrial School was established in the effort to open this door of opportunity. The organization of the school brought together from all parts of the city 145 pupils, mostly from sixth grades, of an average age of above fourteen years and avowedly not strong. The plan has been in operation but a few months and must thus far be considered as an experiment. The outline of work which follows was adopted as merely suggestive, without reference to the amount of time required or the details of daily work. It was thought that the course should cover a minimum of two years with an added year or two for more specialized work if the need for it develops. It is too early to forecast the importance of the experiment, but certain results are already manifest, notably the wonderful development of power in academic work, development of individuality, particularly in some line of handwork, transition from indifference to interest, and above all the realization of the pupils that they are not as helplessly inefficient as they have been led to believe. The visible results are self-respect, poise, and confidence.

The important feature of the course of study is the close correlation and unity of all subjects. In their applications the various subjects are adapted to the special needs of boys and girls. The program is arranged for a day of eight three-quarter hour periods with an added period for lunch at noon. Four periods daily (20 periods weekly) are devoted to academic work including one period for study. The remaining twenty periods are given to occupations including four periods for gymnasium and music. Personal hygiene is taught incidentally in connection with gymnasium and domestic science.

English—Reading and composition, including spelling, punctuation, penmanship, and incidental grammar.

Arithmetic—Fundamental operations having application in actual experiences in business processes and the use of materials.

Geography-History—Grouped about industrial and agricultural centers, including production, transportation, manufacture and their value and social significance.

Woodwork. Boys. Three double periods weekly.

Problems presenting systematic use of tools and general principles of construction, involved in simple projects of use and beauty, applying art principles of form and color and correlating with metalwork, mechanical and freehand drawing.

Problems of commercial value such as appliances for school gardens, window boxes, bulletin boards and frames for school rooms, otherwise made at the repair shop.

Design and construction of furnishings for typical, simple rooms, as class projects, in conjunction with the work of the girls in stenciling, needle work, etc.

Fundamental problems in building construction, observing their application in actual building and later applying in actual work.

Stains, paints and finishes studied and applied in various woodworking projects.

Time card, expense and checking system, estimating, costs, bills, letters, materials, contracts, etc., correlating with English, geography-history and mathematics.

After class talks and discussions, visits to buildings in the process of construction and finish, visits to cabinet shops, paint manufactories, etc.

Drawing, Lettering, Metalwork, etc. Boys. Three double periods weekly. Time and order of the subjects in accordance with needs of other departments.

Freehand sketching—Representation of simple objects, graphically and in view-drawing.

Working Drawings—Simple objects illustrating necessity for and arrangement of views. Conventions of lines, dimensions, sections, etc. Drawing to scale. Related closely to industry by using much illustrative material, drawings, blueprints, etc., and by visits to shops and drafting rooms.

Application in working drawings for the shop.

Lettering—Plain letters and figures used in mechanical and architectural drawing. Types of letters used in reference to artistic effect in spacing and in relation to margins and spaces to be filled. Initials, monograms, tail pieces, line finishings, illuminating. The use of the printing press. Visits to printing offices, etc. Much illustrative material used. Application in connection with working drawings and sketches in the shop, in titles, titlepages, book covers, bulletins, placards, advertisements, business cards, etc.

Design—For the development of the sense of outline, form and proportion, applied in wood and metalwork.

Metalwork—Simple objects in copper, brass and other soft metals, particularly fittings for woodwork, box corners, hinges, escutcheons, catches, drawer and door pulls, plates, surface decorations, etc.

Art. Two double periods weekly.

Applied design—Boys. Portfolios, note-book covers, desk fittings, simple bookbinding, repairing, etc.

Applied Design—Girls. Boxes, note-book covers, belts, pillow covers, spreads, draperies, simple bookbinding, repairing, etc.

Home Science. Girls. Five double periods weekly.

Sewing—Plain sewing, household linen, costumes for the cooking classes, garment cutting and fitting, use of the sewing machine.

Cooking—Plain cooking, study of food properties, table service, sanitation, incidentally laundry work, and furnishing and care of the home.

In both of these subjects there is intimate correlation with the academic work in the study of the production and manufacture of materials. Emphasis is given to actual experience in comparing values and purchasing of material.

In all of the occupations outlined, the practical outlook is obvious. The fundamentals of a great variety of actual trades are touched upon and in the development of the course it is hoped that there may be opportunity for specialization. —W. E. ROBERTS.

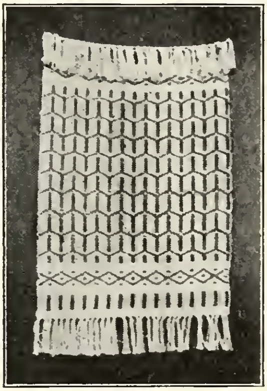
Twenty-five Years old. This year marks the twenty-fifth anniversary of the opening of the Central Manual Training High School in Philadelphia. Formal arrangements for a suitable celebration of this event were made at a banquet held at the University Club of Philadelphia on the evening of February the eleventh. At that time the president of the Board of Education, the high schools committee, and the superintendent of schools conferred with a committee of fifty from the faculty and alumni of the school. Together they outlined the general plan of the celebration which is to take place on the first, second, and third of June. The first day will be known as educational day, when there will be an exhibit of pupils' work in the school building and in the evening appropriate addresses by educators. The second or alumni day will be devoted chiefly to the dedication of a new athletic field and to a track meet. The third day will be called citizens' day and will conclude with a great meeting at the Academy of Music where the speakers will be men prominent in national affairs. Of course the central figure in these meetings will be Dr. William L. Sayre, the principal of the school, who has given the best years of his life to the propagation of the manual training idea, and especially to the administration of this highly successful school. It is a fine tribute to him and the men who have labored with him that Philadelphia now has three manual training high schools.

The mention of this celebration will make many of us feel a little older as we look backward and realize that it is now twenty-five years since manual training work began in public school work in the United States. Somehow it adds a bit more of dignity and consciousness of stability to our work. The Philadelphia school opened as a full-fledged manual training high school with one hundred pupils in 1885. Two years previous some manual training work was begun in the high school at Peru, Ill., and one year previous at Eau Claire, Wis. Work which later developed into the Baltimore Polytechnic High School was also begun before the work at the Central School in Philadelphia, yet to this latter school belongs the credit for developing the first complete manual training high school supported at public expense. Of course all of these were preceded by Dr. Woodward's school at Washington University, but only by a short period of time, the St. Louis school being opened on the sixth of September, 1880. —C. A. B.

Recent Appointments. Word has just been received that Frank M. Leavitt of Boston has been appointed assistant professor in the School of Education at the University of Chicago. He will assist Professor Sargent in building up the new department of art and manual training This appointment is a most fortunate one for the School of Education and means much for the Mississippi Valley. It means another strong man added to the group who are now shaping the manual training work in the great prairie states.

This appointment recalls to mind some of the many important changes that have taken place among the leaders in manual training and industrial education during the present school year in different parts of the country. At the beginning of the year Walter Sargent of Boston came to the University of Chicago as professor of art and manual training. His place in Boston was later filled by the appointment of Theodore M. Dillaway of Buffalo. Last summer there was a reassignment of the directors of the manual arts in greater New York. Walter S. Goodnough was given charge of all the shopwork in the elementary schools, Dr. James P. Haney was made director of art instruction in all the high schools, and Frank H. Collins became director of the drawing in all the elementary schools. A little later Charles F. Perry, principal of the Milwaukee Trade School, was made supervisor of industrial education and manual training for the entire public school system of Milwaukee. Then came the announcement that the department of manual training at

Teachers College, New York, is to be abolished and that Dr. Frederic H. Sykes, professor of English Literature and director of the Columbia extension teaching, is to be the head of a new department which will include both art and industrial education. Arthur L. Williston leaves Pratt Institute in Brooklyn to become the director of the new Wentworth Institute in Boston. The latest announcement is the appointment of C. A. Prosser to take charge of industrial education in Massachusetts under the new State Commissioner, Dr. David S. Snedden. Mr. Prosser comes from New York City, where he was in charge of the school department of the Children's Aid Society. —C. A. B.



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ASSOCIATIONS

OHIO ART AND MANUAL TRAINING TEACHERS' ASSOCIATION.

The annual meeting of the Association was held in connection with the Central Ohio Teachers' Association at Toledo, November 12, 1909.

Owing to the fact that the meeting was held in the extreme north most of the teachers present represented the central and northern sections of the state. However, there were some representatives from the southern part and the attendance was fairly representative of the entire state. The attendance was large and enthusiastic.

The Association opened with a general session presided over by the President, H. W. Lowell, director of manual and industrial arts, Columbus. A number of matters of business were taken care of. The election of officers resulted as follows: President, Geo. A. Seaton, instructor in manual training, Shaw High School, Cleveland; vice-president, Ella Bartholomew, supervisor of drawing, Springfield; secretary-treasurer, Matilda G. Campbell, assistant director of manual training, Toledo; executive committee, W. D. Campbell, director of art, Columbus, and R. F. Schaeffer, instructor in manual training, Columbus.

After the general session the Association met in sections. In all of these sectional meetings the papers were interesting and the discussions spirited.

MANUAL TRAINING SECTION.

The leader was Carl F. Cotter, director of manual training, Toledo. The first address was by George A. Seaton on "Aids to Shop and Drawing Teachers." An outline follows:

1. Creating a favorable environment.
    a. Lectures to public by teachers to show ease of making things, etc.
    b. Exhibits or lectures to students to inspire them to make the most of their chances, etc.
    c. Exhibits in the window of some large centrally located store.
    d. Helpful articles on construction contributed to town paper.
    e. Bringing to town well-known men for lectures to the public.
    f. Formation of arts and crafts clubs.
    g. Short time classes for students who can not give full time to the work.
2. Putting the teacher in proper spirit.
    a. Active participation in clubs and associations.
    b. Frequent visits to other schools to keep in touch with what others are doing.
    c. Summer school study under those of marked personality.
    d. Evening classes in large cities.
    e. Specialized reading—Manual Training Magazine, School Arts Book, Craftsman, Forest Service Bulletins, etc.
    f. Broadening reading.
    g. Planning outlines of work a year ahead.
    h. Making all models before presenting to the class.
    i. Good discipline.

3. Arranging information so that it is easily available.
   - a. Reduce to uniform size and file.
   - b. Standard sizes recommended: 3x5, 5x7, 7x10, 10x14. Store in filing cases or portfolios instead of binding.
   - c. Materials needed: Heavy paper for notes, 5x7; tag board for mounting clippings and pictures; bond paper for tracing illustration; tracing cloth and drawing paper for shop drawings, library cards for indexing articles and references.
   - d. Arrangement: File all things suggestive of models to fit the groups of work planned; other material alphabetically.
   - e. Have an adequate vertical filing case for cards.
4. Making information available for students.
   - a. Examples of work good in design, construction and finish.
   - b. Photos of good work done in preceding years.
   - c. Pictures suggestive of models.
   - d. Photos and pictures of allied things, as trees, etc.
   - e. Samples of woods and stains.
   - f. Large models of some tools, as saws.
   - g. Large charts of more intricate drawings, as parts of planes.
   - h. Uniform size tracings of working drawings for various models.
   - i. Lantern slides of such things as can be collected into a good talk.
   - j. Blueprinted notes of interest to boys for work at home.
   - k. Table on which are books and magazines of interest.
   - l. Demonstration space.
   - m. Bulletin board with general information and helpful motto.
   - n. Blackboard drafting machine for rapid work.
   - o. Wire projection cage.
   - p. Large size drawing models for use in study of developments.
5. Processes of reproducing illustrative material.
   - a. Blueprinting; b. Duplicators; c. Printing press.
6. Time savers.
   - a. Conveniences: Finishing room or stain bench; place for gluing and keeping glue; metalworking bench; screw and nail cabinet; work cabinets along wall under benches; pigeon holes for cut stock and small models; vertical lumber rack; place for large uncompleted work; place for work until graded; storing drawing material; tool racks for rapid inspection of tools; tool panel for general tools.
   - b. Dodges: Index circles on drawings; sandpaper blocks; cutting sandpaper with saw; drill chuck and cut wood-drills; reed and stub pens for rapid signs; coping-saw letters for wood block signs; tool clamps on grindstones; lake sand on grindstone; board for miter box; shop coat for turning; clamp for chamfering; combination note book; celluloid blue print frame.

A paper on "The Present Status of Manual Training in Relation to Industrial Education in Rural Schools," by Dr. B. M. Davis, professor of agricultural education, Miami University, was next on the program. This paper may be published in a future number of the MANUAL TRAINING MAGAZINE.

A paper on "What Other States are Doing with College Entrance Credits in the Manual Arts and What Ohio Should Do," by Thos. K. Lewis, assistant professor of drawing, Ohio State University, followed. Prof. Lewis said in part: "In no case did I find 'art' recognized by any college, but I did find more recognition for 'drawing' than for 'manual training.' Some colleges give entrance credit for both drawing and manual training. When one finds the names shopwork, benchwork and woodworking listed separately and being maintained in name I feel like adding carpentry, joinery and sloyd—we should not omit any of the old fossils. The average college or university (allowing any credit) allows two units credit from a specification of from one-half to two units in manual training or drawing. The North Central Association definition of the amount of time required for one unit seems to have been pretty generally adopted.

"Ohio's needs are more nearly met in manual training than in drawing. In mechanical drawing we need more instruction in lettering, projection and the principles of working drawings than in machine designing. We need more freehand drawing of such a nature as can be accepted for college entrance credit —not drawing for decorative purposes, but the representation of objects and ideas of construction. Design in mechanical drawing should be thoroly correlated with the shopwork courses in manual training."

Mention, in the meeting, of the report of the Educational Committee of the American Federation of Labor, favoring industrial education in the public schools, called forth considerable enthusiasm. The Association sent a telegram to the Federation of Labor, then in session at Toronto, commending it for its stand in the matter of industrial education.

DRAWING SECTION.

This section was led by W. B. Campbell. The first address was by R. B. Farnum, principal of normal department, Cleveland School of Art, on "The Development of Art and Its Probable Future." An outline of the address follows:

1. Development.
    - a. Start in Massachusetts; worth of drawing emphasized by "Master Fowle," 1821.
    - b. Appeal of heads of industries, 1869.
    - c. State law requiring drawing, 1870—Walter Smith.
    - d. Normal Art School of Massachusetts, 1873.
    - e. Emphasis placed on industrial side.
    - f. Idea of objective teaching developed; blackboard drawing used; design, geometrical and formal.
    - g. Change from industrial to pictorial.
    - h. Art schools and classes created demands for classical arts; industrial side lost sight of.
    - i. Arts and crafts movement.
    - j. Back again to industrial side.
2. Future.
    - a. Esthetic side necessary yet industrial will be considered equally.
    - b. Drawing more for education than cultural value.
    - c. Drawing as a means of expression—a language.
    - d. Less painting—"smearing."

e. More design for appreciation; practical for application; close correlation with constructive work.

f. More fact, less fancy.

Miss Florence Beck, instructor in art, Glenville High School, Cleveland, presented the next paper on "Arts and Crafts Problems for the High School." The paper was illustrated with exhibits of work and, in the main, discussed the work offered in the two years of the Glenville High School. Only two years are given in this school, pupils continuing their work in the Technical High School if they desire to do so. The crafts worked out in the first year classes are cardboard construction, pottery and stenciling. In the first craft portfolios, lamp screens, post card albums, etc., are made.

In the pottery classes four pieces are made: A low piece, a high piece, a pattern piece and a tile. Each pupil submits three or four designs for every piece of work; these designs are criticised before the class. These are rough designs but a finished one is handed in of the one selected to be carried out in the material. The clay is furnished by the school but the pupil pays for the glazing and firing.

The stenciling is worked out later in the year when flowers may be used for ideas in colors.

In the second year the craft is leather. The instructor buys the leather and sells it to the pupils in quantities sufficient for the problems.

"We may not all become craftsmen, but we all live surrounded by forms of nature and art. So it is a matter of vast importance that we become alive to the beauties of the one and be able to discriminate between fine and commonplace examples of the other."

Such a general cultivation of the powers of appreciation will offer no handicap to those who intend to follow handicrafts as a profession. On the contrary, it lays the very broadest foundation for such future work. The crafts in the schools furnish technical knowledge and technical skill and promote intelligence, breadth and refinement of a cultural sort.

Miss Bess Cleaveland, illustrator and director of drawing, Washington Court House, read a paper on "Illustrative Drawing." A few quotations from the paper follow:

"What a wonderful advance has been made over the illustrations of the early children's books. Those queer little volumes of goody-goody children of our grandmother's time! Think of the stiff, unreal little people in the queer wide skirts or long narrow trousers, children whose hair never was mussed and whose clothes were always just so! Contrast them with the adorable babies of the books of our fortunate modern child. These children are not models of propriety, but everyday youngsters dressed to play and have a good time.

"Even the school books of to-day are a joy with their interesting pen and ink and wash drawings. The adornment of the school books we used to study was seemingly of little importance to the great ones who decreed what we should use. And did we draw pictures in school? No, indeed; not if the teacher knew it! Oh, yes; we did have a book of uninteresting set designs which we copied painstakingly by the aid of a ruler, but no one cut out pictures to illustrate Mother Goose rhymes and if we drew circus pictures they were done on the sly!

"The making of booklets for the different seasons and holidays opens the eyes of these little people to the beauty of seed-time and harvest, the joy of Christmas giving, the significance of returning life in flowers, birds and butterflies at Easter, as no other work could do."

The next paper was by Miss Cora Z. Parsons, supervisor of drawing, Youngstown, on "Color as a Factor in the Development of the Esthetical Faculties of the Child."

"Nature has such power to charm with her great wealth of color. The beautiful prismatic colors of the morning and of the evening, the grays and golds of the storm and the perfect restfulness of a steadfast blue or quiet gray sky. Morning, noon or night there is always some pleasure to be derived from an intimate acquaintance with the sky. If the sky has much to give, the earth has much more in the way of color. Foreground, distance, middle distance—each with a charm of its own. Greens and grays that soothe and quiet; reds, browns and russets of the autumn that seem to permeate every fiber of the being until it fairly pulsates with color. Power to *see* is what we should make it our duty to give the child; the power to *feel* will come as a natural result.

"Color in the home means so much more than is apparent at first thought. Drummond has said, 'If a man would be a Christian, let him consider his wall paper!' This statement may be extreme but when the effect of color on the nervous system is considered it will not seem overdrawn.

"Children as well as adults like the things they are accustomed to—enough of the harmonious should be placed before them to accustom them to seeing and consequently liking that which is good.

"By the use of proper exercise the training of the color sense to an appreciation of the color from without, the color in the home and the color in personal adornment should lead to keener enjoyment of natural beauty, to the creating of a more restful, refined home and personal appearance that will be attractive to people of refinement and culture."

DOMESTIC SCIENCE SECTION.

This section was led by Miss Matilda G. Campbell, assistant director of manual training and domestic science, Toledo.

A most enthusiastic group of more than thirty teachers were present.

The first paper was by Miss Carlotta C. Greer, instructor in domestic science, Technical High School, Cleveland, on "The Best Educated Girl."

"The girl needs the same fundamental education as the boy; the same quickness of perception and power of accurate thought; the understanding of the laws of nature, and the appreciation of the beautiful; she needs a body glowing with health and strength; she needs to feel a sense of her responsibility to the world and of the purpose for her existence in it; she needs such moral training and environment as will enable us to say of her as a prominent educator said of his boys, 'our boys may go wrong, but we have trained them so that the first start in that direction will be as unnatural as the love of death.'" The paper then proceeded to show that as youth approaches manhood and womanhood there is inevitable differentiation in tastes, capacities and ideals, and consequent necessity for differentiation in education. "For the most part, the girl's requirements on reaching maturity are those of home-making. We surely agree with Van Dyke when he says: 'I care not what a woman's rank in the world may be, there is one place that always will be subject to her sway, wise or foolish, competent or confused, and that place is the home.' It is the trained and intelligent housekeeper, with all that this means in a woman, that is needed; and a woman does not learn 'English thoroness, French art and Arabian hospitality' by intuition." After indicating very clearly, and at some length, the social and economic possibilities involved in the proper education of girls, the paper concluded: "The best education for a girl is one that will make her lovely, useful and intelligent, for it takes 'heart-work, hand-work and brain-work' to make a home. The best education for a girl is one that will make her meet the demands of womanhood, of the womanhood of to-day—of radiating peace and love, of appreciating virtue and intelligence, of inspiring the highest and most perfect living, of serving as a useful, efficient member of society. If in our homes there are these best educated women—sweet, strong, sympathetic, capable home-keepers—the integrity of American youth, the strength of our nation, is secure."

Miss Rachel H. Colwell of Lake Erie College, Painesville, followed with a talk on "The Use of the 100 Calorie Portion in Estimating the Total Food Requirement for the Day."

"We recall that the calorie is the method of expressing the amount of heat furnished by a given weight of protein, fat, carbohydrate burning in the body. The fuel value or calorific value of a food depends upon the amounts of the various food constituents which it contains. Bulletin No. 28 of the U. S. Bureau of Chemistry or Farmers' Bulletin No. 142, gives these figures, but in order to determine the number of calories of protein, fat or carbohydrates considerable calculation is necessary since the bulletin gives only the total number of calories of a food."

To Professor Fisher of Yale is due the suggestion of the "100 calorie portion." He has worked out tables giving the weight, the approximate measure and the calories of protein, fat and carbohydrates in a 100-calorie portion of some of the common foods. The use of these results enables us to rapidly approximate the number of calories of the food served. Take as an example a breakfast:

One large orange	100 calories.
One shredded wheat biscuit	100 calories.
⅝ cup of milk	100 calories.
One large egg	100 calories.
One thick slice bread	100 calories.
One level tablespoon butter	100 calories.
Five teaspoons of sugar	100 calories.

"This makes a total of 700 calories.

"If it is desired to make the breakfast menu for six people it is merely necessary to take six 100-calorie portions. The relation of the calories of protein to the total calorie portion may be made by determining the number of calories of protein in the 100 calorie portion and from that the number of calories in the om that the number of calories of proteinin the meal can be rapidly estimated."

Miss McKinley, supervisor of domestic science at Dayton, then told a little of the work that is being done at Dayton. She said that they were particularly fortunate in having the whole session of the morning or afternoon for each class.

Miss Campbell emphasized the necessity of correlation of the work in the other departments. She said that the community life is lost when the pupil does everything for herself. In the Toledo Manual Training High School the boys in woodworking made a bed and the girls the bed clothes. She emphasized the point of the relation of the pupils' work to their outside life.

The Domestic Science Section effected an organization with Miss Greer as chairman and Miss Bess Thompson, instructor in domestic science, Dayton, secretary-treasurer. The chair was given the power to appoint the executive committee. In addition to the main meeting next fall with the Ohio Art and Manual Training Association, all teachers of the section were urged to meet in Cleveland, February 11th, at the time of the Northeastern Ohio Teachers' Association. The desire was expressed to see what was being done in the work over the state by exhibits shown at the meeting. F. C. WHITCOMB,

Miami University, Oxford, Ohio.

SOUTH DAKOTA EDUCATIONAL ASSOCIATION.

The Association met in Lead, November 1-3, 1909. The attendance was larger than at any previous meeting. The general meetings were held in the Assembly Hall of the High School, and the department meetings in the High School building.

The theme of the Association this year was "Industrial Education." As this was the first state meeting to be held in Lead, and as Lead is the home of one of the greatest of industries, gold mining, the industry that has put South Dakota among the first in wealth in the Union, and as the Lead schools are foremost in the state in industrial education, the committee fittingly chose industrial education as the theme of this meeting.

The following addresses and papers were given: "Industrial Education in Agricultural Communities," Prof. Eugene Davenport, University of Illinois; "Industrial Education for the Rural Schools," C. G. Lawrence, County Superintendent of Lincoln County; "Industrial Education in Germany," Dr. Bernard Thompson, Vermilion, S. D.; "Industrial Education at Tuskegee Institute," Booker T. Washington; "Manual Arts for the Primary and Grammar Grades," W. A. Burk, Lead; "Relation of Drawing to Construction Work," Mrs. Hattie Moore-Mitchell, Des Moines, Ia.; "Is Training in Manual and Domestic Arts Feasible for the Ordinary Independent District, and if so, What Should be the Beginnings in Instruction and Equipment?" W. A. Burk, Lead.

W. A. BURK, Lead, South Dakota.

NORTH-EASTERN OHIO TEACHERS' ASSOCIATION.

The Domestic Science and Art Section of the North-Eastern Ohio Teachers' Association met in Central High School, Cleveland, Feb. 11. The morning program had three excellent numbers, all helpful to teachers and instructive to anyone interested in Domestic Science. Miss Flint of Ohio State University read a paper on "Domestic Art: Its Content and Possibilities," in which she showed the larger field open to domestic art. Not only does it deal with dress but also with all textiles connected with the home. Every pupil should have a course in art, in order to be able to use good judgment in matters of form, color or design.

The Cleveland, Canton and Toledo courses of study in household economics were discussed by the various supervisors.

The address of Benjamin Andrews of Teachers College, Columbia University, proved the climax of the morning. He spoke of the advances made in the teaching of domestic science in our leading universities, using Cornell and Columbia as examples. Columbia has equipped a new building with all modern machinery for laundry work, cooking and baking and housekeeping on a large scale, hoping thus to train young women as supervisors or managers in institutions, and widen the industrial field open for them. He also explained the new system of units and standards which is to bring household economics up to the requirements of the exact sciences.

About seventy domestic science and art teachers enjoyed an excellent luncheon served by one of the classes in the school lunch room, and they also enjoyed several speeches which followed. An exhibition of domestic art was very much appreciated.

In the afternoon the Ohio Chapter of the American Association of Household Economics was organized. Many teachers retain their membership as individuals in the Ohio Art and Manual Training Association but feel that thru the correlation with the National Association, domestic science interests in Ohio can be greatly stimulated.

A reception was given by the Cleveland Domestic Science and Art Club at the Y. W. C. A. All those who attended the Convention felt that they had been inspired and encouraged professionally and delightfully entertained socially.

THE ILLINOIS MANUAL ARTS ASSOCIATION.

The seventh annual meeting of the Association was held in Jacksonville on Friday and Saturday, February 18-19, and proved to be one of the most profitable and stimulating the Association has had. In no other city where the Association has met has there been greater interest in the proceedings on the part of the citizens nor a more hospitable reception. The programs were made attractive by music furnished by the high school mixed chorus and orchestra, under the direction of Miss Ailslee Goodrick and G. H. Wilkinson respectively, and by pupils from the State School for the Blind. The local arrangements were in the hands of Miss Anna G. Brown, director of manual training, ably seconded by Superintendent W. A. Furr, and nothing was left undone to make visitors feel at home.

The officers were: President, L. W. Wahlstrom, Francis Parker School, Chicago; vice-president, S. J. Vaughn, State Normal School, DeKalb; secretary-treasurer, W. H. Henderson, Springfield. All the details of the meeting were well in hand.

At the Friday afternoon session the principal address was by Walter Sargent, University of Chicago, on "Art in Relation to Manual and Industrial Training." It was a very practical and helpful discussion and was much appreciated by the manual training teachers present. He said in part: "Formerly little distinction existed between the fine and industrial arts. The architect and the metal worker was also the designer, painter and sculptor. The result of the separation when it did come was unfortunate. The artist out of touch with constructive work tended to become superficial and the industrial worker out of touch with art produced ugly things. We are now seeing the importance of bringing art and constructive work together again. The art teacher should include in his preparation some constructive work and the teacher of manual training should have some practice in freehand drawing and design. . . ."

Mr. Sargent showed by a number of illustrations that there are three essential elements in esthetic satisfaction. Any piece of construction must have these three elements to secure esthetic approval: (1) It must serve its purpose perfectly, and exemplify excellent craftsmanship; (2) It must have order of related parts —consistent proportions; (3) Suitable decoration; whatever decoration there is should emphasize material and construction, and accentuate the purpose of the thing made. "Manual training teachers appreciate and emphasize one factor in esthetic satisfaction, namely technic and adaptation to purpose. Art teachers often emphasize another, namely, ornament. These are not antagonistic. Both should be present. Appreciation is the result of a fine sense of fitness and a pleasure in adding to utility an element of grace by making the object consistent in its proportions and ornament. . . .

"Teachers of design have over emphasized the value of originality. For one person who will design wall paper a thousand will have to buy it. It is of more value to the majority to learn to choose a good wall paper than to design a mediocre one. . . ."

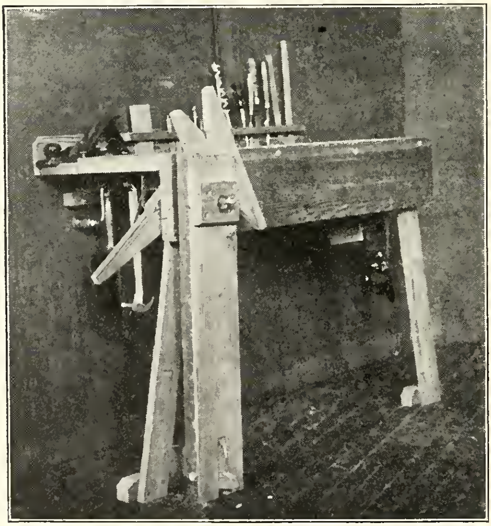

FIG. 1. WORK BENCH AND EQUIPMENT FOR RURAL SCHOOL, TO COST ABOUT $13.

A discussion of the topic, "The Manual Arts in Rural Schools," was presented by Clinton S. Van Deusen, Bradley Institute, Peoria, and Louis H. Burch, State Normal School, Macomb. Mr. Van Deusen exhibited a work bench and equipment of tools, to cost in all about $13, and a set of twelve woodworking projects, and outlined a plan for providing shopwork for one-room rural schools by means of a traveling supervisor. The plan was worked out in detail and was so well received by the Association that a committee was created to see that such steps are taken as may be necessary to give the plan a trial under actual conditions. The discussion brought out the following reasons for offering manual training in rural schools: It would give boys new interests and tend to keep them on the farm; in would keep more boys in school: farm work needs system and manual training would help to develop it in boys; modern farm machinery requires technical knowledge such as is gained in manual training work.

The proposed cooperative plan for twenty-five pupils contemplates a traveling supervisor who plans the work for the pupils, provides the necessary materials, has general care of the equipment, provides printed instructions which the pupils are to follow, directs and criticizes the work, and visits each school once a week. The schedule proposes that the supervisor spend one hour at each of five schools on each school day. The cost of the plan is shown to be about $60 per school per year.

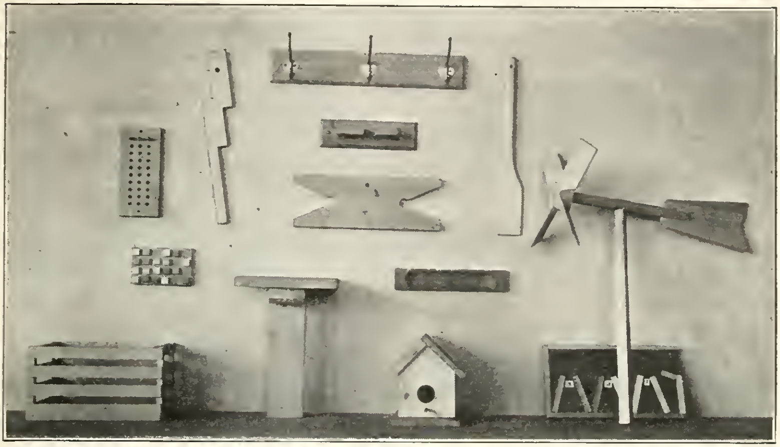

FIG. 2. SUGGESTED WOODWORKING PROBLEMS FOR RURAL SCHOOL.

The annual banquet was prepared and served by the second and third year pupils under the direction of Miss Kate Louise Brown of the Domestic Science department and was greatly enjoyed by the 75 guests who were fortunate enough to be present. The menu cards formed pleasing souvenirs of the occasion in the form of small handsaws, the covers being made of blueprint paper and one course being printed on each page.

After the banquet Mayor H. H. Bancroft and President Harker of the Woman's College welcomed the Association to the city. The company then adjourned to the auditorium to listen to the principal address of the evening, which was given by Charles A. Bennett, Bradley Polytechnic Institute, Peoria, on "Some Suggestive Features of Industrial Education in Germany." The address was illustrated by a large number of excellent lantern slides and presented a vivid and intensely interesting picture of conditions in this department of public education in Germany. Three general types of schools were illustrated and discussed: the manual training school; the continuation school; and the technical school, or trade school.

At the Saturday morning session the report of the committee on Course of Study in the Manual Arts for Elementary Schools was presented by the chairman, Fred D. Crawshaw, University of Illinois. The report was in the form of a neat pamphlet of twelve pages, the presswork being done by the pupils in the Francis W. Parker School, Chicago. It contains carefully prepared outlines of courses arranged by grades for the following lines of work: woodworking, freehand and mechanical drawing, clay, bookbinding, metalwork, and textiles. After full discussion the report was formally adopted by the Association as a working basis for the year, with the understanding that the committee is to further elaborate certain parts. A number of the members present pledged themselves to use the outlines in their schools and to report their observations to the committee from time to time during the year.

The completion of this tentative course of study, upon which the Association has been working with various changes of committee almost since its first year, marks a really important achievement and more than justifies the existence of the organization. When this report is printed for distribution, as it doubtless will be by the new Executive Committee, it is sure to be in demand.

At the business session a number of important matters were acted upon. A committee was appointed to urge upon the State Department of Public Instruction and the Educational Commission the need of state supervision and encouragement of the manual arts in the schools of Illinois.

Invitations for the holding of the meeting in 1911 were received from a number of cities: Springfield, LaSalle, Aurora, University of Illinois at Urbana, Bradley Institute at Peoria, Oak Park, and a combined invitation from the State Normal University at Normal and the High School at Bloomington. After several ballots it was decided to meet in Normal and Bloomington.

The officers for the ensuing year are: President, William T. Bawden, State Normal University, Normal; vice-president, Edwin J. Lake, Department of Fine Arts, University of Illinois, Urbana; secretary-treasurer, re-elected, Wilson H. Henderson, director of Manual Training, Springfield.

❧

The Manual Training Section of the Utah Teachers' Association held two very interesting sessions during the holidays. Dean Balliett of New York City was the principal speaker and was much enjoyed. At the close of the meeting the guests were entertained at a domestic science luncheon. Exhibits of needlework and handwork from the State Normal School and the public schools of Salt Lake City were features of the meeting. The new officers are: President, D. W. Parratt, supervisor of manual training, Salt Lake City; secretary, Miss L. A. Moorhead, University of Utah.

❧

The Manual Training Section of the Texas Teachers' Association elected the following officers at the last meeting: President, Cree T. Work, State Industrial School, Denton; secretary, N. S. Hunsdon, San Antonio; treasurer, Miss Lena Bumpass, Dallas.

BUFFALO MANUAL ARTS TEACHERS' ASSOCIATION.

A copy of the Constitution of the Association recently organized in Buffalo, New York, has been received. The second meeting was held on February 12th, at which time the plans were perfected and officers elected. The officers are: President, F. H. Wing; vice-president, A. S. Hurrell; secretary, V. M. Stone; treasurer, W. A. Wheeler. There are four standing committees: Executive, Publicity and Exhibit, Program, and Membership.

OKLAHOMA.

Manual training teachers of Oklahoma have formed an organization with the name: Oklahoma Manual Training and Drawing Association. The officers are: President, L. P. Whitcomb, director of manual training, State Normal School, Weatherford; vice-president, William Aitkenhead, Norman; secretary, Vern O. Wilson, Edmond; treasurer, Charles H. Dillon, Duncan; Chairman of Executive Committee, R. R. Barlow, Mounds.

The program of the Central Teachers' Association, held in the auditorium of the State Normal School, Edmond, Oklahoma, February 25-26, gave an unusual amount of time to the discussion of manual training problems.

❧

The Pacific Manual Training Association held its regular spring meeting at Santa Monica, California, the latter part of March.

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On Saturday, February 19th, the State Board of Education and the Massachusetts Normal Art School Alumni Association held an institute. The morning program included addresses by Dr. Snedden, State Commissioner of Education, on "The Influence of Industrial Education on Drawing Teachers," and Frederick P. Fish, Chairman Massachusetts Board of Education, on "The Influence of Industrial Education on Manual Training Teachers." The afternoon program included papers by Leslie W. Miller, of Philadelphia, on "The Place of Drawing in Industrial Education," and Frederick L. Burnham, State Agent in Manual Arts.

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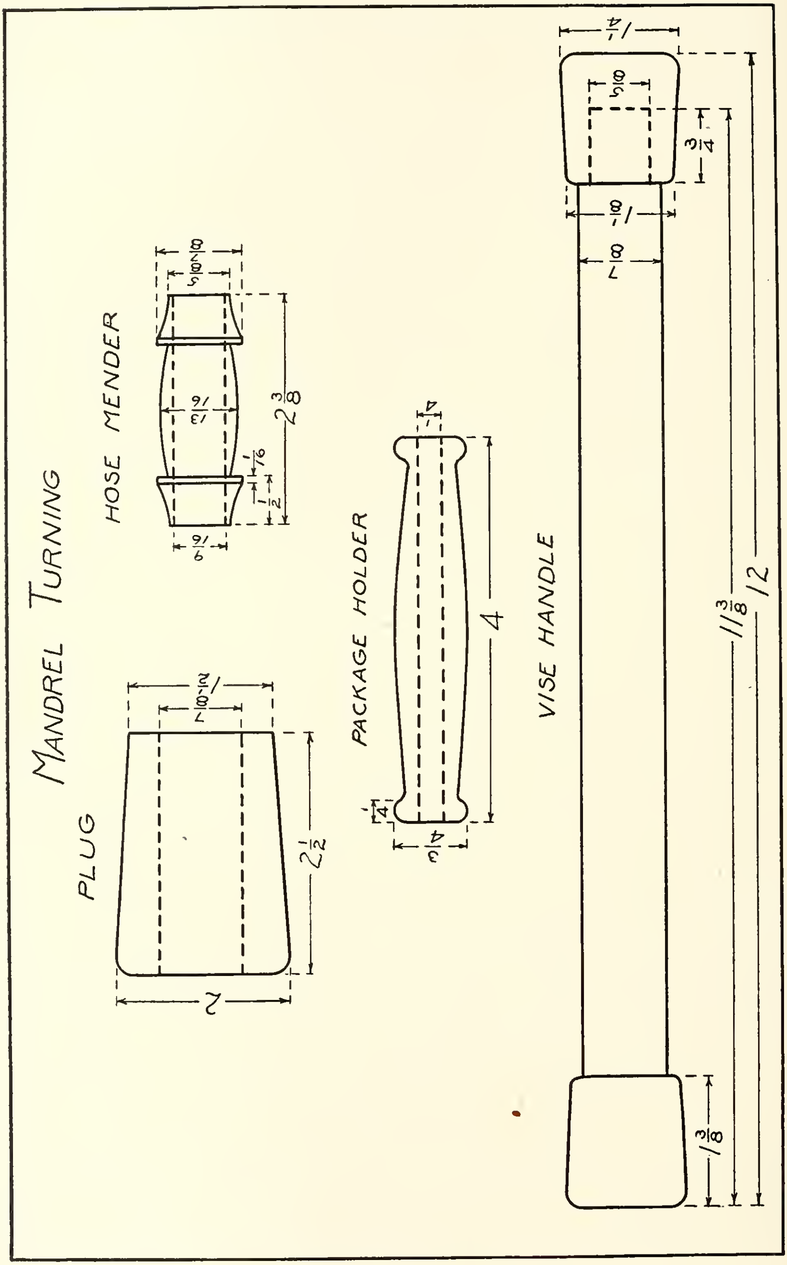
At the February meeting of the Boston Manual Training Club, Frank M. Leavitt, assistant director of drawing and manual training, presented a paper on "Recent Experiments in Industrial Education in Boston Public Schools."


MANDREL TURNING
PLUG
$1\frac{1}{2}$
$\frac{7}{8}$
$2\frac{1}{2}$
2
HOSE MENDER
$\frac{7}{8}$
$\frac{5}{8}$
$\frac{13}{16}$
$2\frac{3}{8}$
$\frac{1}{16}$
$\frac{1}{2}$
$\frac{9}{16}$
PACKAGE HOLDER
$\frac{1}{4}$
4
$\frac{1}{4}$
$\frac{3}{4}$
VISE HANDLE
$1\frac{1}{4}$
$\frac{5}{8}$
$\frac{3}{4}$
$1\frac{1}{8}$
$\frac{7}{8}$
$11\frac{3}{8}$
12
$1\frac{3}{8}$

SHOP PROBLEMS

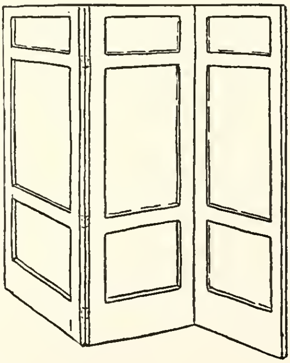
GEORGE A. SEATON, Editor.

MANDREL TURNING.

One or two pieces in mandrel turning could well find place in any course in wood turning. Some of the very simplest of these are given in the drawing. In washing blueprints it is not often that the ordinary school is provided with trays of suitable size nor is there a proper sink. The plug shown is planned to fit the escape opening in one of the large wash basins at Shaw High School, where ordinarily the stopper is placed. By forcing the plug in place and having the water enter the far corner of the basin through a rubber tube attached to the faucet, it is possible to secure a body of running water whose depth is equal to the length of the plug. The hose mender is not very well known, yet when its name is given it is not difficult to see how it is intended to be used. In carrying heavy packages it is often more easy to handle them if they can be held by the string. This cuts the hand, but if the package holder shown is slipped into place before the string is tied the remedy is at once found. The dimensions for the vise handle may be altered to suit the vises where it is made. If a number of the handles are made each year they will generally find a use before long, even if the boys do not care to keep them for home outfits. The cap at the right is forced onto the end of the bar and turned to size and shape in this position.

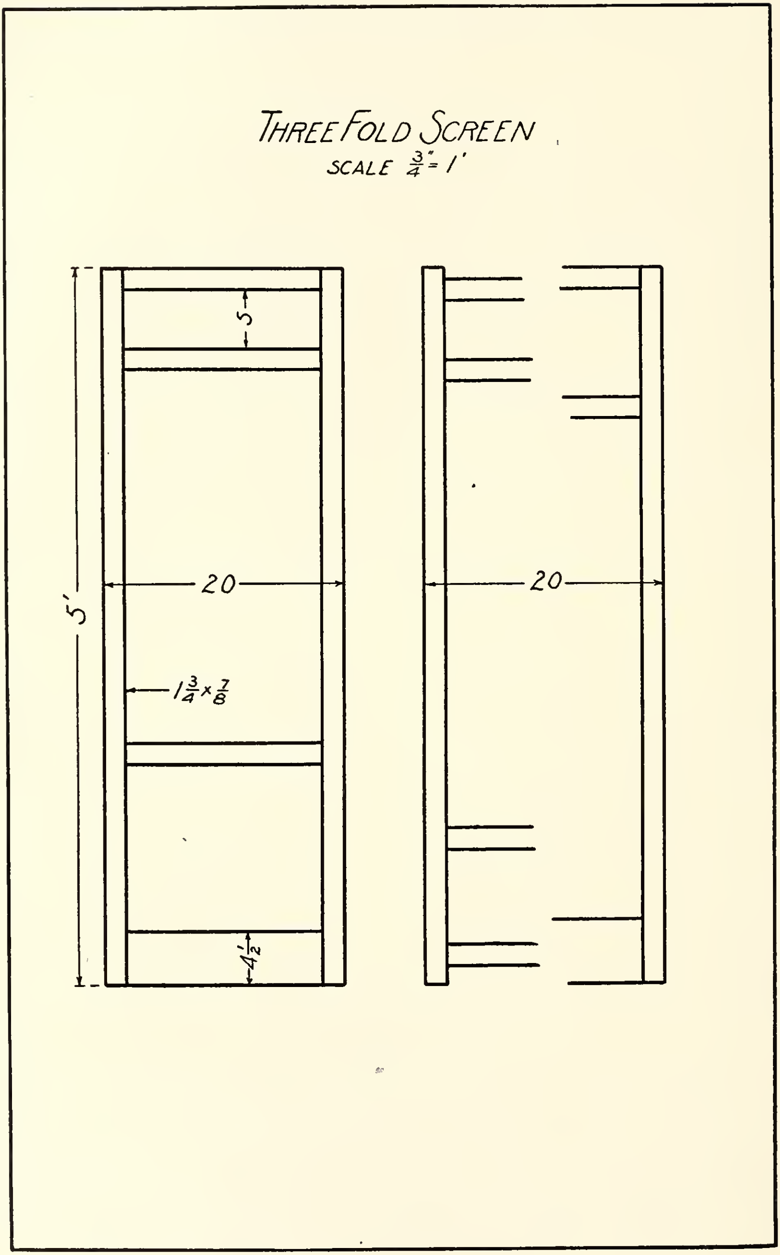
THREE FOLD SCREEN.

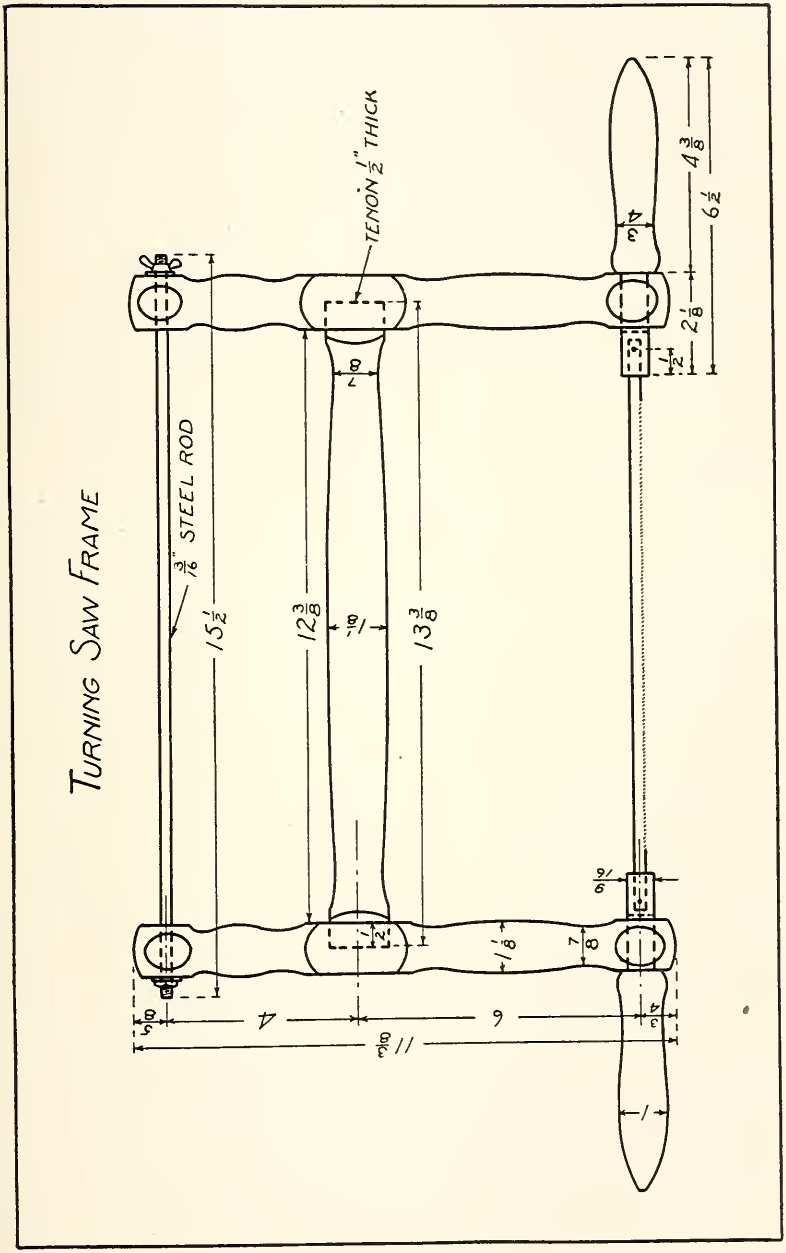
The drawing of the three fold screen by W. E. Roberts of Cleveland presents another problem in the division of surface by the judicious arrangement of the rails. At the left is given the complete drawing for one section of the screen, while at the right are the suggestions of what some of the other solutions of the problem might be. The sections of the screen may be joined together with ordinary hinges placed so that the plan view of the screen forms a letter "z" or double-acting hinges may be used which will allow the sections to swing in either direction.

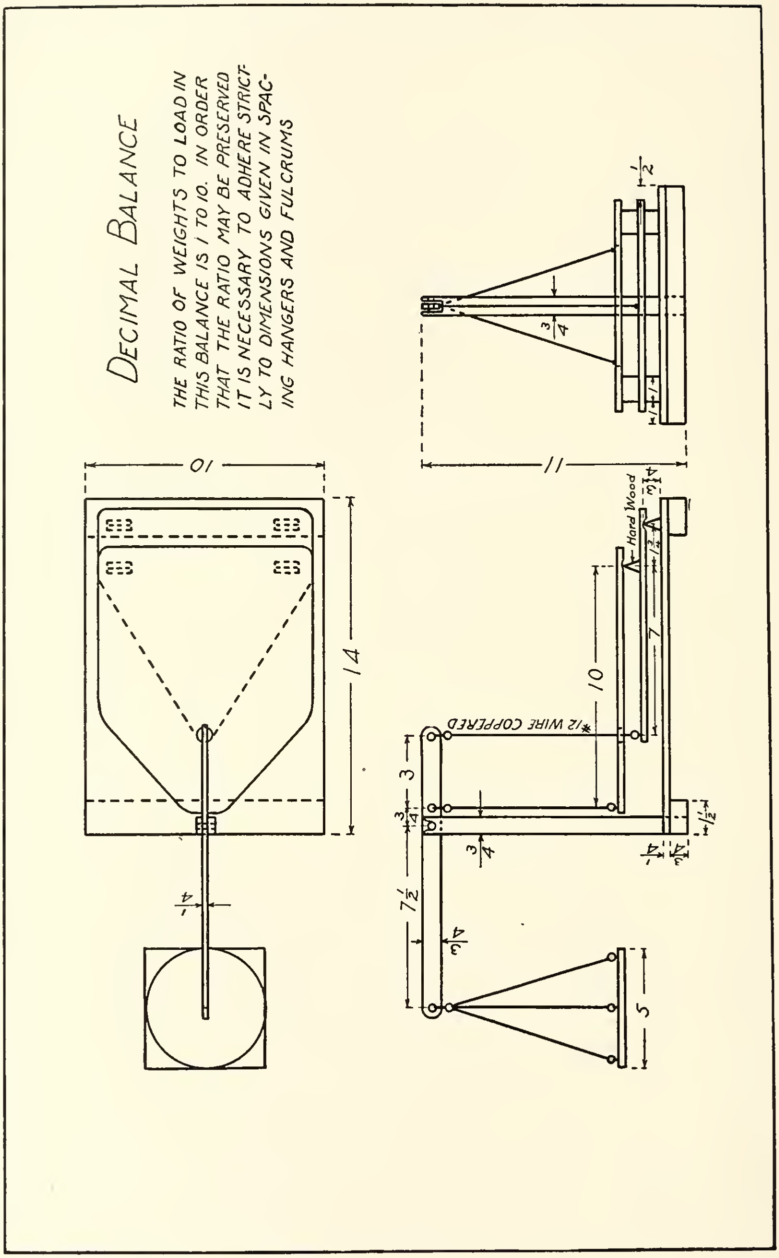


TURNING SAW FRAME.

This design by C. L. Johnson of East Cleveland is but the result of a need that had to be met. In use it has demonstrated its fitness as it has proved to be much more substantial than the regular frames which were purchased as part of the equipment. Tho the part of the handle to which the blade is attached is made of maple instead of metal, it seems to serve the purpose admirably. In case there are no dies available with which to thread the steel rod, a heavy cord can be substituted which can be tightened by twisting.


THREE FOLD SCREEN
SCALE 3/4" = 1'
5
5'
20
1 3/4 x 7/8
4 1/2
20


TURNING SAW FRAME
3/16" STEEL ROD
15 1/2
12 3/8
1/8
13 3/8
TENON 1/2" THICK
7/8
1/2
1 1/8
7/8
3/4
4 3/8
6 1/2
2 1/8
1/2
9/16
5/8
4
6
3/4
11 3/8
1

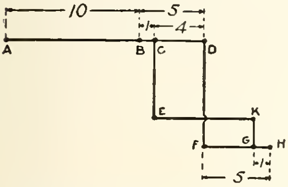


10
14
1/4
11
1/2
3/4
1/4
Hard Wood
3/4
1/4
7
10
#12 WIRE COPPERED
3
3/4
7 1/2
3/4
3/4
5
1/4
3/4
1/2

DECIMAL BALANCE

THE RATIO OF WEIGHTS TO LOAD IN THIS BALANCE IS 1 TO 10. IN ORDER THAT THE RATIO MAY BE PRESERVED IT IS NECESSARY TO ADHERE STRICTLY TO DIMENSIONS GIVEN IN SPACING HANGERS AND FULCRUMS

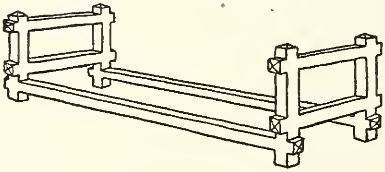
DECIMAL BALANCE.

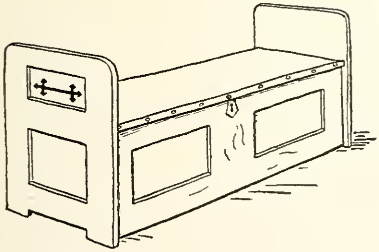


The decimal balance was contributed by Hans Schmidt of St. Paul. The diagramatic sketch will help to an understanding of its action. The whole balance consists of a series of levers, AC, AD, and FH, with arms of the ratio 1:10, 1:2, and 1:5, respectively. As A is depressed say 10 inches, D and F rise 5 inches, but as FH:GH::5:1, the fulcrum rises one-fifth of 5 inches or 1 inch. From this the term Decimal Balance. It is evident that if the load is applied on the platform FH, the ratio of load to force would vary, depending upon where the load is placed, so the platform EK is placed and hung upon C, so that both points K and E rise in the same ratio, or one-tenth of the movement of the point A, and it is therefore immaterial where the load is placed on EK.

BOOK RACK.

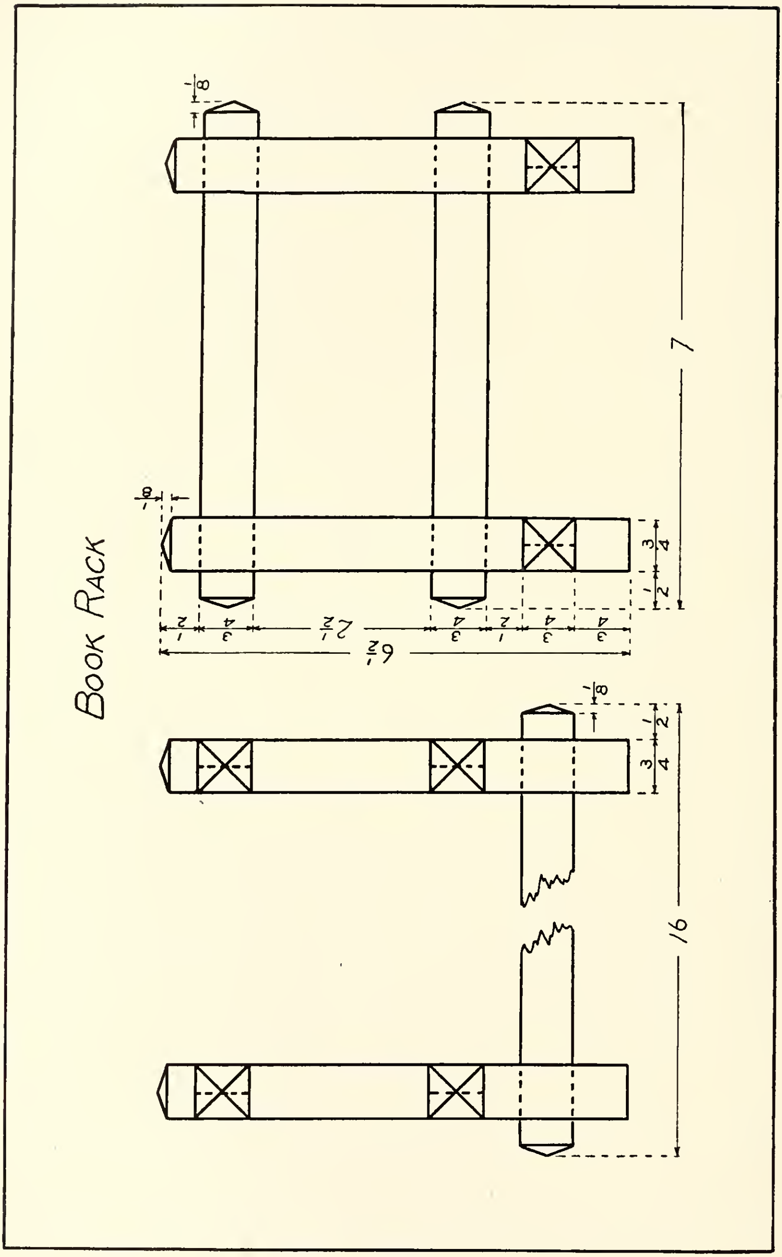
Of devices for holding books there seems no end, yet the one here illustrated is so out of the ordinary that it merits attention. Step by step there is nothing difficult in its construction, yet when twelve half-lap joints have been completed, they must have been accurately done if the whole is to go together successfully.

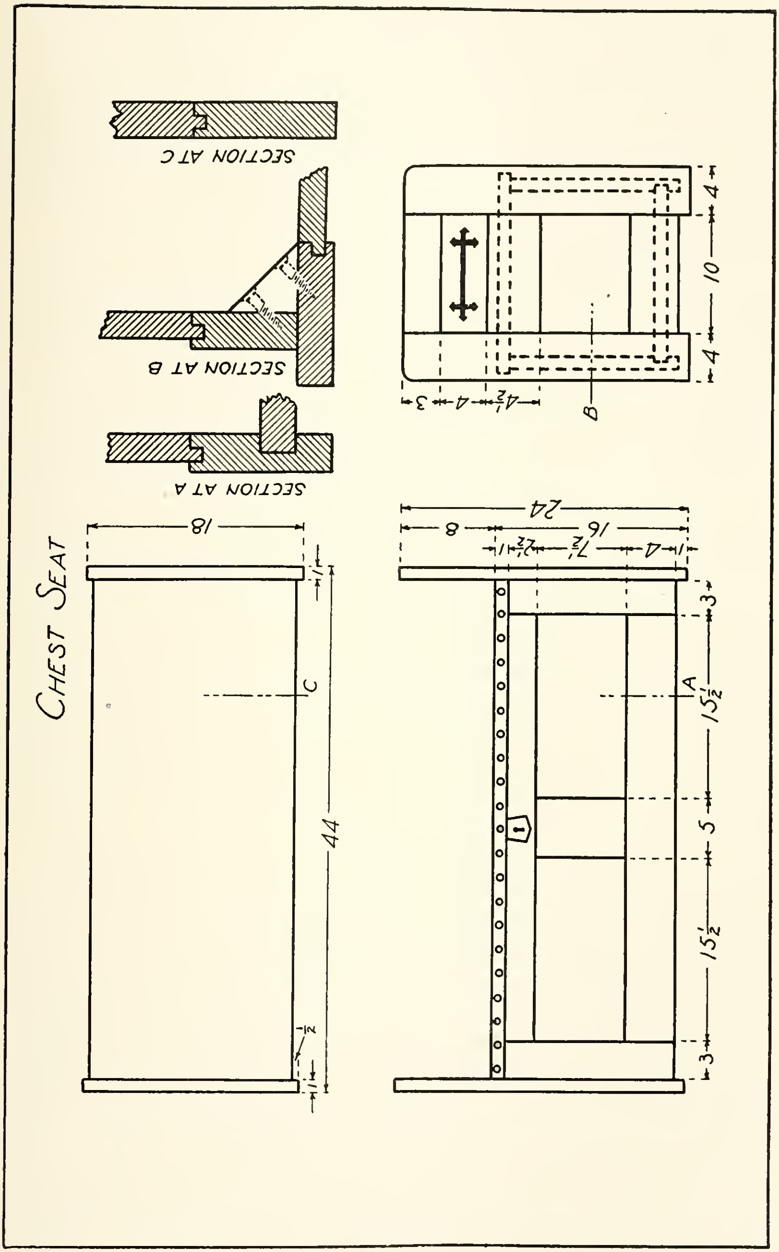




CHEST SEAT.

The design for a chest seat was worked out by C. W. Angier while a student at Bradley Polytechnic Institute and attracted considerable favorable attention. Its attractiveness is largely due to the excellent proportions of the panels and the rails which separate them.


BOOK RACK
1/8
1/8
1/8
7
3/4
1/2
1/2
3/4
2 1/2
3/4
1/2
3/4
3/4
6 1/2
1/2
3/4
16


CHEST SEAT
SECTION AT C
SECTION AT B
SECTION AT A
18
44
1
½
1
C
24
8
16
1
2½
7½
4
1
3
A
15½
5
15½
3
4
10
4
3
4
4½
B

CURRENT ITEMS

Clinton S. Van Deusen, Editor.

Miss Anna C. Hedges resigned last January from her position as principal of the Hebrew Technical School for Girls in New York City to accept the chair of Household Economy at the University of New Zealand. Her new duties do not begin until January, 1911, and she is using the interval of a year for study and travel.

NORTH ATLANTIC STATES.

Charles A. Prosser of New York City, who has been Superintendent of the Industrial and Trade Schools of the Children's Aid Society, has been appointed state deputy commissioner of education for Massachusetts to look after industrial education under Commissioner Snedden.

Manual training has recently been started in the 7th and 8th grades and high school at Kane, Pa. Two rooms in the high school building have been quite thoroly equipped for drawing, woodwork, and work in cold metal. This was done largely by the aid of a donation. The work is in charge of D. K. Hiett.

A $60,000 art building will be erected during the coming summer at Mechanics Institute, Rochester, N. Y., which will greatly relieve the crowded condition of the school. The enrollment during last year was nearly three thousand.

Carl H. Au has resigned as machine shop instructor at Mechanics Institute. Eugene Knowlton, assistant superintendent at Hall Signal Works, Rochester, has taken Mr. Au's place.

Mrs. Nelly Hattersley, director of the School of Domestic Arts, Pratt Institute, died in North Wales on January 15th. Tho she was seriously ill when she went to England last summer, it was hoped that she would be able to return returned to England last summer, it was hoped that she would be able to return to her work. Her loss to the Institute, and to the wide field of domestic art work, is a very great one.

BOSTON.

Theodore M. Dillaway, formerly director of drawing for Buffalo, has been appointed director of drawing and manual training for the city.

W. Stanwood Field, submaster Lewis School, has been assigned to the investigation of the subject of continuation schools.

Arthur L. Williston has resigned as director of the School of Science and Technology of Pratt Institute, to accept an appointment as director of the Wentworth Institute, which is being organized in Boston. The institute was provided for by the will of Arioch Wentworth, who died several years ago, and will be modeled largely after Pratt Institute. Three buildings are to be put up. They, with their sites, will represent an investment of $4,000,000.

Developing the plan initiated last year, when an open air class was held, there has been instituted this winter an open air school in Franklin Park with four rooms. In connection with this a small manual training room has been established.

It was found necessary to fit up a second manual training room in the Oliver Wendell Holmes district to care for the numerous classes of the sixth, seventh, and eighth grades.

An interesting exhibit of work done by the industrial class of the Quincy School was recently held, when samples of metal work were shown, including blackboard rule handles, tool checks, card frames, and cast iron parts for school furniture. The work of the class consists of chipping, filing, scraping, laying-out, drilling, countersinking, bending and fitting.

William F. Kenfick of the Municipal Printing Plant has been appointed instructor in the Pre-Apprentice School in Printing and Bookbinding. This school is at present rebinding a large number of damaged supplementary reading books, and is also making a quantity of stenographers' notebooks.

SOUTH ATLANTIC STATES.

To further the interests of manual arts in Georgia, Fred J. Orr, director of manual arts at the State Normal School, Athens, is sending a traveling exhibit of manual arts work to schools over the state requesting it. The exhibit consists of charts with varieties of students' work in the form of drawings, color studies, work in design, school house plans, etc.

WASHINGTON, D. C.

Plans for the third extension to McKinley Manual Training School are now in preparation. Last winter Congress appropriated $195,000 for land and buildings for this extension. The plans thus far include nineteen class-rooms, a new engine room, engineer's repair shop, steam and electrical laboratory, vise shop, and a lunch room for pupils. It is hoped that Congress will reappropriate a balance of about $60,000 which was left after completing the second extension, last year. If this hope is realized it is expected that a gymnasium with swimming pool, locker and shower-bath rooms will be provided, probably in a detached building. The pending appropriation bill carries the money for equipping the extension. The enrollment at McKinley this year exceeds 1,000 pupils, about four-fifths of whom are boys.

It is also expected that this Congress will provide for a much needed extension to the Armstrong Manual Training School. It is planned to include a swimming pool, shower and tub baths, six class-rooms, a model five-room housekeeping apartment, and an assembly hall. The bath and swimming pool will probably be so located that they can be used by the public as well as by the school. The enrollment at Armstrong this year is well above 600 pupils. Over 500 of these are in the manual training courses, the others in the business course.

The twenty-nine manual training centers for boys in the grades are similarly in need of "extensions" but Congress has so far declined to increase the appropriation for this part of the work. It is probable, however, that new buildings, specially designed for the purpose, will be provided for two of these centers during next year.

Special manual training instruction is now given at eight white and eight colored schools for incorrigible and atypical pupils. An evening school in woodworking has been opened and the regular teachers of these ungraded classes are given an opportunity to prepare themselves better to aid the special manual training teachers.

Evening classes in woodworking are conducted in two of the grade centers and at Armstrong, as heretofore. At the latter school there are also classes in the commercial subjects and in woodturning, patternmaking, forging, machine shop, and boiler, engine and dynamo management, for men, and in sewing, dressmaking, millinery and cooking, for women. Highly satisfactory results are obtained. Volunteer services on the part of the principal and a sufficient number of teachers at McKinley made it possible to open an evening school there. Over 500 were enrolled. It was hoped that the object lesson thus provided would so impress Congress that the funds necessary to maintain this evening school permanently would be provided.

SOUTH CENTRAL STATES.

Manual training will be included in the regular work of the Clinton, Okla., schools next year, under direction of Supt. Burnham.

Examination questions have been collected from the instructors in manual training in the State Normal Schools, by the State Superintendent of Oklahoma, with a view to placing them in the regular teachers' examinations for State certificates.

EL PASO, TEXAS.

Bert Ashurst of Chico, California, has been appointed instructor in shop work. There are now five men and ten women instructors in the manual training department of the El Paso schools.

The new Vilas school is being equipped with a shop for the boys, and a sewing equipment for the girls. The Douglass school (colored) is being equipped for domestic science, free of charge, by the El Paso Gas and Electric Co.

The high school classes in applied art, under the instruction of Miss Fannie Henning, are accomplishing some good results. This work includes stenciling, tooled leather, pottery and art metal work, which have been introduced here this year for the first time.

The laundries which have been started in the Mexican schools under a competent instructor, are giving satisfactory results. The course in laundry includes not only the practical work, but also the study of hard and soft waters, of soaps, of various agents used for softening the water and whitening the clothes, of bluing and starch in their scientific as well as their practical relation to laundry work, and a study of the proper treatment of linens, cottons, woolens and silks. The work also includes the cleaning and pressing of garments, with the methods of removing the various kinds of spots and stains.

NORTH CENTRAL STATES.

Three new centers for seventh and eighth grade work were recently opened in Cleveland; they are at the Denison, Fairmount, and Fowler schools. At the Denison School the woodwork is in charge of Charles Harrison of Normal, Ill., and Miss Lenore Tiefenthaler has the cooking. At the Fairmount School Earl E. Crane is in charge of the woodwork and Miss Susanna Birkner of the cooking.

Miss Bertha Gordon, teacher of woodwork at Case School center, Cleveland, because of illness, was obliged to give up her work in January for the remainder of the year. Her position is filled by H. S. Huxtable from Racine, Wis. Miss Margaret Lang from Milwaukee Downer College was appointed in January to domestic science work in seventh and eighth grades.

The late Hon. Arthur Hill has left $200,000 to the Union School District, of Saginaw, West Side, Mich., for the erecting and equipment of a school. $125,000 is for the building and equipment and $75,000 will be an endowment. According to his wish it will be an industrial school where the trades, including forestry and agriculture, are to be taught.

A trade school was started January 5th of this year in connection with the public schools of Saginaw, Mich. W. R. Burt of that city has donated $2,000 to pay the expenses for the first year. It was planned to begin with but one class, and in response to an evident demand the present aim of the school is to give special attention to the machinist's trade. Only boys over fifteen years of age were admitted this year and twenty-eight were enrolled in the class. It is proposed to arrange a three years course and for the first year 6¼ hours a week are devoted to woodwork, 6¼ to ironwork, 6¼ to mechanical drawing, 5 to arithmetic, and 3¾ to English. In the second and third years the entire shopwork time of 12½ hours will be devoted to ironwork.

The manual training work which was started nearly three years ago in the State Normal University at Carbondale, Ill., has been extended by the addition of eleven new lathes and a band saw. The woodwork is in charge of L. C. Petersen and Miss Grace Jones is in charge of the domestic science work which was started this year.

MINNESOTA.

Louis F. Best, who taught at Marinette, Wisconsin, last year, began his duties in September, 1909, as instructor in mechanical drawing in the Central High School, St. Paul, and George F. Grant is in charge of the general shop work in the same school.

Frank I. Solar, who completed his two years' manual training course the last of January, began work in one of the manual training centers of St. Paul the following week, and Rupert Church was placed in charge of another center at about the same time.

Ernest E. Heuser was elected to handle one of the grade centers in the public schools of St. Paul where are brought together the boys who are somewhat backward, or who are somewhat hard to discipline.

The manual arts department of the St. Cloud Normal school last year added to its equipment six large new cabinet benches, seven new drafting tables, one motor head speed lathe and a complete set of general tools to go with the outfit. A large new pottery kiln and glazing room was also built. The director is Leonard A. Williams.

The manual arts work in the grades and high school at Sauk Rapids is in charge of Miss Bertha Biebighauser.

Aitken started manual training this year with Edward L. Dales in charge of the work.

The manual training department at Fergus Falls has recently installed six speed lathes, a band saw and a hand jointer.

WESTERN STATES.

Mrs. Laura M. Curtis has been appointed instructor of sewing in grades 7 and 8 of the schools of Helena, Mont.

Colorado, unencumbered by tradition, has been, from the beginning, an exponent of manual training. Cities and smaller communities in nearly every part of the state are either seeking manual training supervisors or are looking forward to the introduction of the work in the near future. The Manual Training High School of Denver has so increased in attendance as to make an annex, accommodating 500 pupils, imperative. The new North Side High School building will be provided with complete manual training equipment, and a preparatory vocational school, or something along this line, is hoped for in the near future.

Salt Lake City opened its new fire-proof Jefferson School building on January 31st. The building is provided with one of the best manual training shops in the West.

Supervisor D. W. Parratt of Salt Lake City was delegated by the State of Utah to attend the meeting of the National Society for the Promotion of Industrial Education in Milwaukee. While away Mr. Parratt spent considerable time in studying the manual training work in Chicago, Milwaukee, St. Louis, Kansas City, and Denver.

Sidney Bovingdon has recently left Seattle to take charge of benchwork in the upper grades at Bellingham, Wash.

Frank H. Beckman was elected to install manual training in the public schools of Garfield, Washington, beginning his duties February 1.

CALIFORNIA.

The State Normal School of Manual Arts and Home Economics has met with a pleasant reception from all sources and the outlook is very bright. The school in its temporary quarters is doing good work with a full, tho necessarily limited, enrolment.

Pomona has finished its new $40,000 grade manual training building and took possession during the mid-year promotion week.

Huntington Park has voted $4,000 for manual training equipment and is to have its own power plant.

Compton High School is to add forging to the department the coming year.

South Pasadena is going to install manual training and domestic science in the grades and high school the coming year.

Santa Cruz and Auburn have recently opened domestic science departments and expect to establish sloyd work next year.

Since the passing of the act making it possible to use State money for manual training several country districts have taken advantage of the new law and several new buildings have included in their arrangement rooms for this special training. Los Alamos has such a school.

REVIEWS

Sketches for Mechanical Drawing. Arranged for Industrial Students. By Anson W. Smith. Published by the Author at Pratt Institute, Brooklyn, N. Y. 5¼x8 in. oblong; pp. 56 (4 inserts in heavy paper cover) punched for binding with a cord or brass fastener; price, 40 cents. Inserts are sold separately at $1.00 per dozen.

This work is the result of long experience in teaching drawing to mechanics and industrial workers. It presents the problems of practical drafting in the most concrete and practical way, without the study of descriptive geometry as such or even the theory of projection. It begins with three views of a rectangular block and proceeds to develop power in practical drawing thru a series of carefully selected models—one piece of a cross-lap joint, a try-square, an anchor plate, a base block, a tool post slide, planer V-block, and tool saddle—all straight line work. The second series begins with circles—a flanged bushing, clutch thimble, spur gear blank, miter gear blank, flanged pulley, coupling flange, box wrench, fork wrench, pipe bellows, air chamber, and hand wheel. The third series begins screw threads by a study of an ordinary vise screw; then it takes up a jack screw, and so on thru the usual list of screws and nuts in their conventional representation. The fourth series takes up additional problems similar to those in series one and two, but more difficult, involving foreshortening, construction of the ellipse, etc. A fifth series will be added on gearing. A feature of the work is the large number of tables of data from which mechanical elements may be worked out. For example there is a table for counterbores, keyways, fork wrenches, pipe elbows, tap drills, handwheels, different styles of bolts and screws, etc.

From beginning to end the aim of the author is to keep the student in the atmosphere of the shop while teaching him how to draw, to make him familiar with standard data and teach him how to use it intelligently. The method is sound not only for industrial workers but for all beginners even tho they afterwards study the theory of projection. From the standpoints of interest, development in power to draw and growth in industrial intelligence this method is so far superior to the old method involving, first, numerous line exercises, second, an exhaustive study of geometric problems and, third, descriptive geometry, that it seems strange that some teachers of mechanical drawing still persist in beginning in the "good old way." We believe in teaching descriptive geometry as such, but we do not believe in teaching it until the pupil has learned enough about mechanical drawing to appreciate something of its value. Whether Mr. Smith has saved time by omitting all reference to the theory of drawing we are uncertain, but we are sure that his method of approach to the subject of mechanical drafting is sound. —C. A. B.

The Essentials of Lettering. A Manual for Students and Designers. By Thomas E. French and Robert Meiklejohn. Varsity Supply Co., Columbus, Ohio, 1910. 6x9 in., oblong; pp. 72; price, $1.00.

Of the many textbooks on lettering old and new, large and small, this is the best we have ever seen. Indeed it is just what we have been wanting for several years. It considers lettering, not as a branch of mechanical drawing, but rather as freehand drawing and design. Whatever use is to be made of lettering, the underlying principles are the same. Form, stroke, spacing and composition are fundamental whether the lettering is applied to engineering drawing, a shop sign, or a title page. Too often we have used one book for the student of engineering and quite a different one for the student in the art school. Now we have one book that is equally good for both and seems the better for each because it meets the needs of the other.

The book begins with a brief historic outline, then takes up the construction of the old Roman alphabet. This is followed by the modern Roman, showing the strokes as well as the proportions, then the commercial Gothic, and later the single stroke Gothic, both upright and inclined. There are well-illustrated chapters on composition, selection of styles, and letters in design, including manuscript letters, script, art nouveau and other modern forms. Monograms and ciphers are also considered. The book closes with a good bibliography.—C. A. B.

Craftsman Homes. By Gustav Stickley. The Craftsman Publishing Co., New York, 1909. 8½x11 in.; pp. 205; price, $2.00.

This book, printed in the same style as *The Craftsman* magazine, is full of valuable suggestions for the home builder, whether he is planning a beautiful suburban residence or an unpretentious bungalow for mountain-side or seashore. It opens with a chapter on "The Simplification of Life," by Edward Carpenter. This is followed by one on "The Art of Building a Home," by Barry Parker and Raymond Unwin. Then follow floor plans, perspectives, and descriptions of more than thirty houses of different types, but all with true Craftsman individuality. Next the different elements going into a house are discussed: Porches, pergolas, and terraces; the effective use of cobblestones; the natural garden; halls and stairways; the living room; the dining room; treatment of wall spaces, etc. Later the furniture is taken up, also metalwork and needlework. One chapter is on "cabinet work for home workers and students who wish to learn the fundamental principles of construction." This includes many simple, suggestive designs. The last chapter is on the craftsman idea of the kind of home environment that would result from more natural standards of life and work. Mr. Stickley deserves much credit for his continued efforts in behalf of rational art and rational living in America. —C. A. B.

The A B C of Lettering for Public Schools. By Schuyler Bull. Published by the Author at 564 Averill Ave., Rochester, N. Y. Four plates, each 7x10¼ in.; price, 16 cents.

The first plate is a practice sheet showing how to make simple letters with a pencil; the second gives plain Gothic alphabets and figures; the third gives the Roman letters; and the fourth gives conventional lines and examples of lettering and dimensioning. Accompanying the plates is a double sheet of instructions. The author evidently believes that lettering is both freehand drawing and design and that in order to learn to letter the student must practice thoughtfully with good examples before him. —C. A. B.

Elementary Course in Perspective. By Sherman N. Turrill. D. Van Nostrand Co., New York, 1910. 5x7½ in.; pp. 71; price, $1.25.

This book gives two methods, one by the use of the plan, the other the scale method. The first of these is for the mechanical draftsman, the second for the artist and freehand draftsman. While the book is elementary, it assumes that the student is more or less familiar with descriptive geometry. In fact the author states in his preface that he has endeavored to illustrate the mechanical application of the principles of descriptive geometry to the making of perspective drawings. The diagrams are on extension leaves, very clear and convenient for use with the text. —C. A. B.

The following have been received:

Addresses and Proceedings of the National Education Association Meeting at Denver, Colorado, 1909. Dr. Irwin Shepard, secretary, Winona, Minn. This report contains an exceptionally large number of papers dealing with problems of industrial education. Among the most important of these is the president's address on "The Need, Scope, and Character of Industrial Education in the Public School System," by Dr. L. D. Harvey, president of Stout Institute, Menomonie, Wis.; "Unity in Education and Its Preservation While Meeting the Demands for Industrial Training" by Dr. Eugene Davenport, Dean of the College of Agriculture, State University of Illinois; and "Industrial Education as a National Interest," by Dr. Elmer E. Brown, United States Commissioner of Education. The minutes of the departments of Art and Manual Training also contain several strong papers.

Progress in Agricultural Education, 1908. By Dick J. Crosby. Published by U. S. Department of Agriculture, Washington, D. C. A pamphlet of 288 pages with twelve plates of half-tone illustrations.

Annual Report of Indianapolis Public Schools, 1908-1909. This report of 240 pages contains much of interest to supervisors of the manual arts. The report of Superintendent C. N. Kendall and of the high school principals, as well as those of the supervisors of art, manual training and domestic art are of more than passing interest. The numerous well-selected illustrations show in an admirable way the progressive character of the school work of Indianapolis.

Course of Study in Industrial Art, Domestic Science and Art, and Manual Training, Columbus, Ohio. A forty-two page illustrated pamphlet issued by the Columbus Board of Education.

Course of Study in Drawing and Applied Art, Cleveland public schools. By Florence E. Ellis. This outlines the work for each grade by months and the high school work by terms.

Annual Report of North Bennet Street Industrial School, 1908-1909, Boston, Mass. This interesting illustrated report tells the story of a most effective institution for social betterment. Thru its educational classes, library, clubs, and social service house, it reaches about 3,500 people each year.

Industrial Education as carried on at the Jewish Orphan Asylum, Cleveland, Ohio. By Charles Marten, Director of Industrial Arts. This illustrated booklet gives an outline of the industrial studies and a brief statement of their development during the past four years. The outline of art and constructive work for the lower grades is given by months, and is very complete. The outline for industrial and commercial geography and history are likely to prove especially suggestive to other schools. The value of excursions to industrial plants is emphasized in the last part of the booklet.

The Value and Limitations of Industrial Education. By T. C. Inborden, Enfield, N. C.

Normal School Instruction in Agriculture. By M. J. Abbey. Circular No. 90 issued by the Office of Experiment Stations, U. S. Department of Agriculture, Washington, D. C. A thirty-one page pamphlet containing a syllabus of the work recommended.

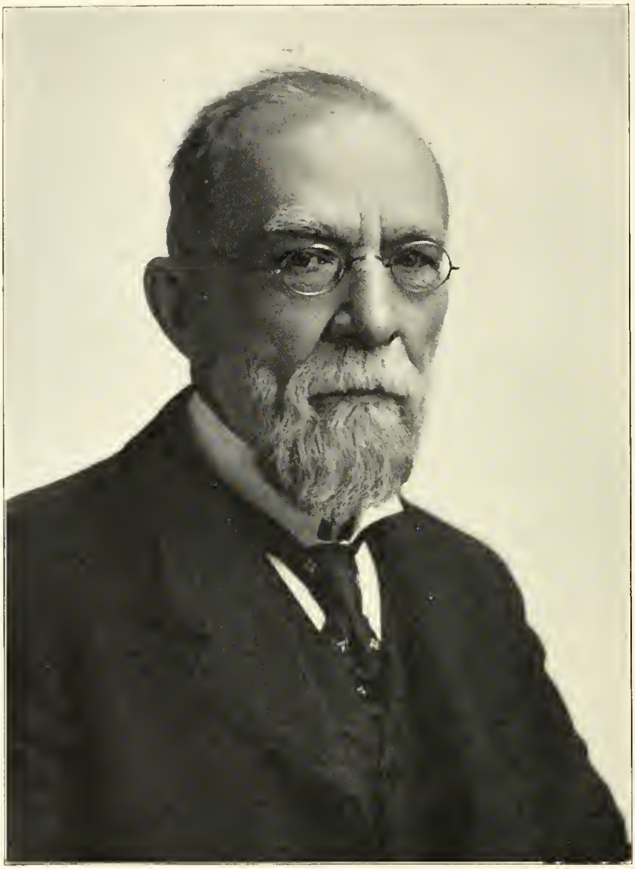
Annual Report of Public Schools of Springfield, Illinois, 1909. Contains brief outlines of manual training and domestic science, and illustrations of equipments and work done.

How to Run Farm Machinery. By Fred R. Crane and Arthur J. Bill. Bulletin issued by the College of Agriculture, University of Illinois. "Easy and illustrated lessons in care and repair of plows, mowers, binders, and gasoline engines; how to mix and use concrete." For use in high school.

The Interlaken School. "To teach boys to live." Stone Lake, LaPorte, Indiana. Dr. Edward A. Rumely, president. This American representative of the "New School Movement" issues a beautiful circular of information. The new edition contains illustrations of fine brass bowls beaten up by the boys, and the interior of a Dutch dining room built by them. It also shows the boys at work outdoors, plowing and haying. "Man must not merely learn first and then do, but seek to learn by doing."—Pestalozzi.

Industrial Education. Published by the American Federation of Labor, 801-809 G Street, N. W., Washington, D. C. Price, 25 cents. This is the special committee on industrial education which has attracted so much attention in public print during the past few months. Teachers who are seeking to know the real problems of industrial education as they appear to the man who is to profit most by their solution should read this report.

The Council of Education of the Southern California Teachers' Association. P. W. Kauffman, secretary, Pomona, Calif. This report of the meeting held in Los Angeles last December contains "The Lost Chord in Education," a stimulating address in the modern spirit by Arthur H. Chamberlain. The "lost chord" is adaptability. "We are constantly spoiling good mechanics for poor clerks, or good clerks for poor clergymen, or are converting excellent agricultural timber into second-rate politicians."



DR. C. M. WOODWARD

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PENCIL SKETCHING FROM NATURE.[1]

JAMES PARTON HANEY.

THE painter of pictures in oil or water color works in a medium which permits various degrees of light and dark. He has many values at his command. One who sketches from nature with pencil has no such advantage. His range is limited. It is his to suggest nature rather than to produce her various planes in all their complexity of light and shadow. The pencil sketch must, therefore, be far more simple than the painted picture. To secure this breadth and simplicity is the constant effort of the artist.

The present discussion will be limited to an effort to illustrate by typical subjects, how the draftsman proceeds when in the presence of his model. A word, however, may be prefaced with regard to the necessary materials. These include practically nothing save pencils and paper and a smooth-covered portfolio in which the sketches may be carried. In the field this portfolio will serve as a drawing board and for this purpose should be provided with a stout rubber band which should be so adjusted that the upper edge of the paper may be slipped beneath it, while the sketch is being made. The paper itself should be of cream color rather than dead white or a bluish tone. It should have a moderate tooth and softness that its surface, when pressed upon firmly by the lead may be ironed out and leave no suggestion of the surface grain in the stroke.

Only the best of pencils should be employed. At least six are desirable, a 3B, B, F, H, 2H, and 4H. The beginner should confine himself to a 2B, F, and 2H. Each pencil should be cut in half, so that one end may be firmly pressed in the palm of the hand while the point protrudes just beneath the forefinger. The thumb and middle finger will then serve to support the point on either side. This firm grasp of the pencil is absolutely essential to success in using the tool to paint broad lines and large masses of color. The point of the lead itself should be ground off obliquely until it will serve to make a broad and even line like that described by a small brush. For finer lines or for the broken lines needed to represent roughened textures the side of the lead is employed or the point itself rolled under the fingers as the line is drawn. Illustrations of this broken line appear in the details of branch and foliage shown in the drawing of the cedar tree.

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[1] Copyright, 1910, by James P. Haney. Presented before the Eastern Art and Manual Training Teachers' Association, the drawings being made in the presence of the audience.

Before attempting to sketch in the open it were wise for the beginner to practice much with the pencil, first in making long straight lines, broad and full and of even color thruout. Following this he may build up masses of tint, with lines of this description placed side by side so that all trace of the separate stroke is lost and the surface presents one even tone thruout. Practice in building up small masses, at first an inch or so in extent and later of larger size, will soon enable the draftsman to produce tones almost as flat as those laid on with a brush.

⁂

The drawing of the fishing huts shows the simplest elements of a pencil sketch, but it is to be remembered that this simplicity has been due to the omission of details present in the model. The latter with its play of light and shade on shingles, on sand hollows and beach-grass offered abundant opportunity for over-elaboration. In every stroke of the sketch it was necessary to withstand the temptation to draw too much.

If it is decided to use the little group of houses as subject for a sketch, it becomes necessary to determine first what particular part of the scene shall be made to serve as the center of interest. This center is to be located somewhere near the center of the paper, and about this will be introduced the most careful drawing, with more detail and contrast of light and dark than elsewhere. The different planes of the picture must next be studied until one has noted those surfaces which together make up the various forms. The sandy road forms one such plane, the house front another, and the roof a third. The whole scene indeed is made up of nothing but these surfaces. It must be the artist's business, with half-shut eyes, to study these various slopes and their

values of light and dark, oblivious of smaller details, like the shadows in the road or the tangle on the rolling dunes.

After a brief study of the planes one must decide which of them near the center of interest, may best be left light, and which made dark, that effective contrast may result and the appearance of solidity be secured. As one proceeds in the study of pencil drawing, one comes to learn more and more that it is upon the proper disposition of what may be termed the "contrasts" that the success of each sketch depends. Nature herself offers these only in part; that is, she shows us some light planes and some dark ones, but her light planes are of various grades of lightness and the duller approach closely in value to the lighter shadow planes, so that in our model of the huts there are a large number of planes so nearly of one tone that they can scarcely be said to contrast at all. To attempt to reproduce all of these, or even most of them, would be to involve us in an elaborate drawing in which the charm and sparkle of the good pencil sketch would entirely disappear. The draftsman must, therefore, determine his contrasts. He must say of his model, "this plane I shall leave light with just a touch or two of accent, but this alongside of the first I shall make dark that my white may appear whiter and my dark darker, and now against this darker plane I shall place on the other side another light plane," and so on. Thus one proceeds to develop a sketch as a pattern of lights and darks, remembering to keep the most sparkling contrasts near the center of the picture.

We may now proceed to consider further the subject of our sketch. With a pencil of medium hardness we lay in the necessary lines of our drawing. This requires but a few touches to tell us where the rooftree of the first house will come, and where its main angles must be located. Here we place a light line for the sea and there a touch or two to remind us where the edge of the sandbank is to stand. After the drawing is thus carefully but with great lightness, placed on the paper, we may proceed to mass in the front of the house as it lies in shadow. This we do with firm, short strokes (F pencil), intentionally allowing a few flecks of light to creep in here and there as if caught upon the warped and upturned edges of weather-beaten boards. The roof and sides we now touch in the with the edge of the pencil. In order to secure our sharpest contrasts, we place no tone upon them and, therefore, must have recourse to line to indicate the details of structure.

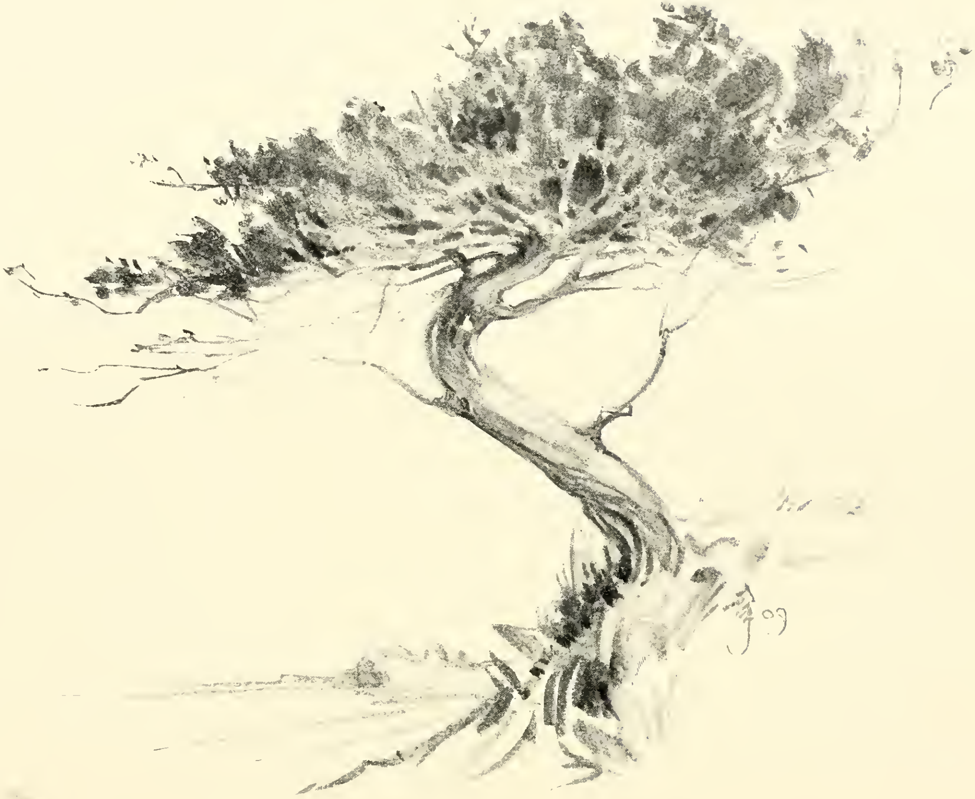
The front of the second house is now massed in not quite as dark as was the first, for we are farther from the center of our picture. The shadows under the eaves are drawn with short emphatic strokes and small breaks here and there to indicate the play of light along the ragged edges. The runway to the door with its boxes and barrels is blocked in with crisp and brushlike marks. Each of these spots is to be kept clearly in mind as some small plane contrasting with its neighbor and by its shape or position suggesting the solidity of the form it represents.

With a pencil (2H) one or two degress harder, we next mass in the right-hand sand-bank. Where the bank comes next the light plane of the houses it is drawn in solidly and a few spears of the gray beach-grass are shown to suggest the tangle which covers the top. As we work down to the foreground the masses of our shadows on the sand become smaller and lighter and finally end in lines which run out toward the edge of the picture. These lines play an important part in every sketch. They serve to continue the foreground planes out to where there is nothing save white paper.

The light falls full upon the left sand-dune, and we see that the darker plane is the one formed by the waving beach-grass which caps the bank. It would never do, however, to draw this in as a full dark mass for it is too far removed from the center of our picture. We must be content, therefore, to suggest it by a few small patches of tone. These are to be drawn with the edge and side of the lead that the idea of the plane made up of many waving grass-blades may be given. Now with the lead held lightly we trace the edge of the bank itself, a little twist of the point here and there making a sharper accent suggesting the shadow under the edge of the sand-cap. The road we draw in similar fashion with the lead rolling under our finger tips, so that the the lines now widen, now narrow, as they sweep forward. Little of the detail of the road can be introduced into our picture. The dozens of ruts we reduce to two or three and the scores of footprints and puzzling checker of shadows from bits of flotsam, are simplified into a few dots of accent which themselves make a little pattern on the white of the roadbed.

Our picture now stands out with something of solidity but it still lacks the sharper contrasts which are only to be gotten by the use of the darker lead of a 2B pencil. This we employ sparingly but very firmly, keeping the edges of each stroke crisp and sharp and blocking in the gaping doorway, the windows of the huts, and a few of the darker shadows made by the supporting piles.

The sketch would now appear to be complete, yet seems to lack something in the foreground which shall by its color serve to emphasize the whiteness of the sand and balance the dark mass of the house front. A



small bayberry just at our left is the very thing needed, so with an F pencil we paint this in, striving to secure with as little detail as possible, the effect of the rounded mass of dark and glossy leaves. A touch or two of the 2B pencil in the shadow of the bush completes the drawing, leaving, as all pencil sketches should leave, much to the imagination of the observer, but breathing something of the open freshness of the sea and the dazzle of the sun upon the sand.

⁂

For our second subject we will choose a gnarled and twisted cedar with tenacious rootlets dug into the crevices of the bank. This sketch will serve to illustrate the approach to all tree drawing. Every tree has a character of its own and it were wise for the beginner to elect to draw from a model where that character is distinctly shown. The rounded masses of a perfect maple or a beech are far less interesting and attractive, and far more difficult of satisfactory rendering, than are the twisted arms of a ragged oak or the gaunt majesty of an old white pine.

Before drawing the cedar, we must study its anatomy carefully, noting just how its branches rise from the trunk and break into leaf and twig. Again we must decide on the center of interest in this picture. This, if our sketch is to be of a single tree, will naturally appear where the branches and leaf masses form the most pleasing pattern.

Our preliminary drawing is again the simplest shadow of an outline that the sketch may be properly placed upon the paper. Twigs or branchlets that it is desired to leave white, we will touch in with the pencil, as a hint, when we solidly mass in the leafage, where the lights are to be left. Beginning now with a pencil of medium softness, an F or B, we build in the mass of foliage at the top using smart short strokes.

Just as in the drawing of the first houses we must "think sand" when we draw sand, and bay when we draw bay, so now we must "think" the tight cedar foliage as we draw it, and in a moment more we must think the gnarled and twisted trunk as with a harder pencil we follow down the branches and main stem to the ground. In drawing the foliage we have allowed it to break here and there into short sprays which rise above the main masses. These spots we must keep as few as possible, striving to make each count as a good piece of drawing to help the observer think leaf as he sees the little square pencil marks before him.

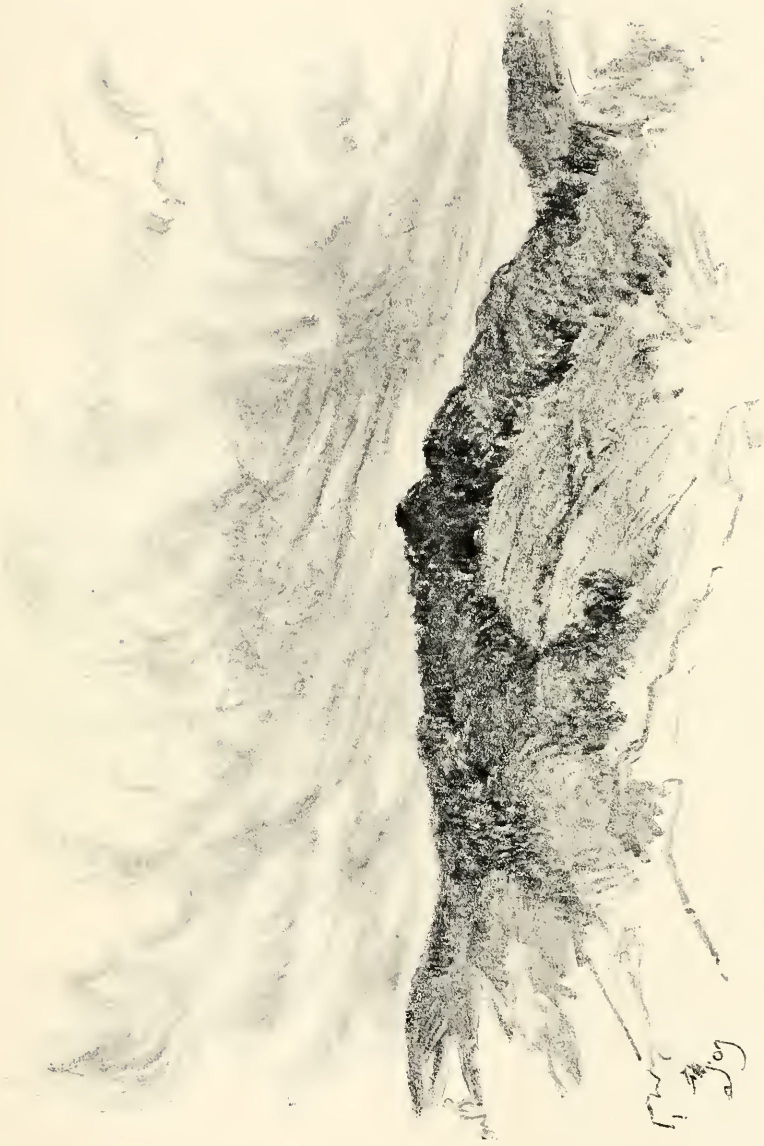
A few details of bank and grass are added below, and then with softer lead one reconsiders the model with half-closed eyes, seeking to see where the darks can be distributed most effectively so as to make the masses of foliage already drawn appear as light planes in contrast with the deeper shadows. In the gloom beneath the leaves appears a tangle of half-seen branches. With a softer pencil these can now be brought out, the blacker lead serving in the deeper shadows to create the necessary difference of tone. A few accents in the grass of the cliff and one or two upon the tree trunk serve to complete the sketch.

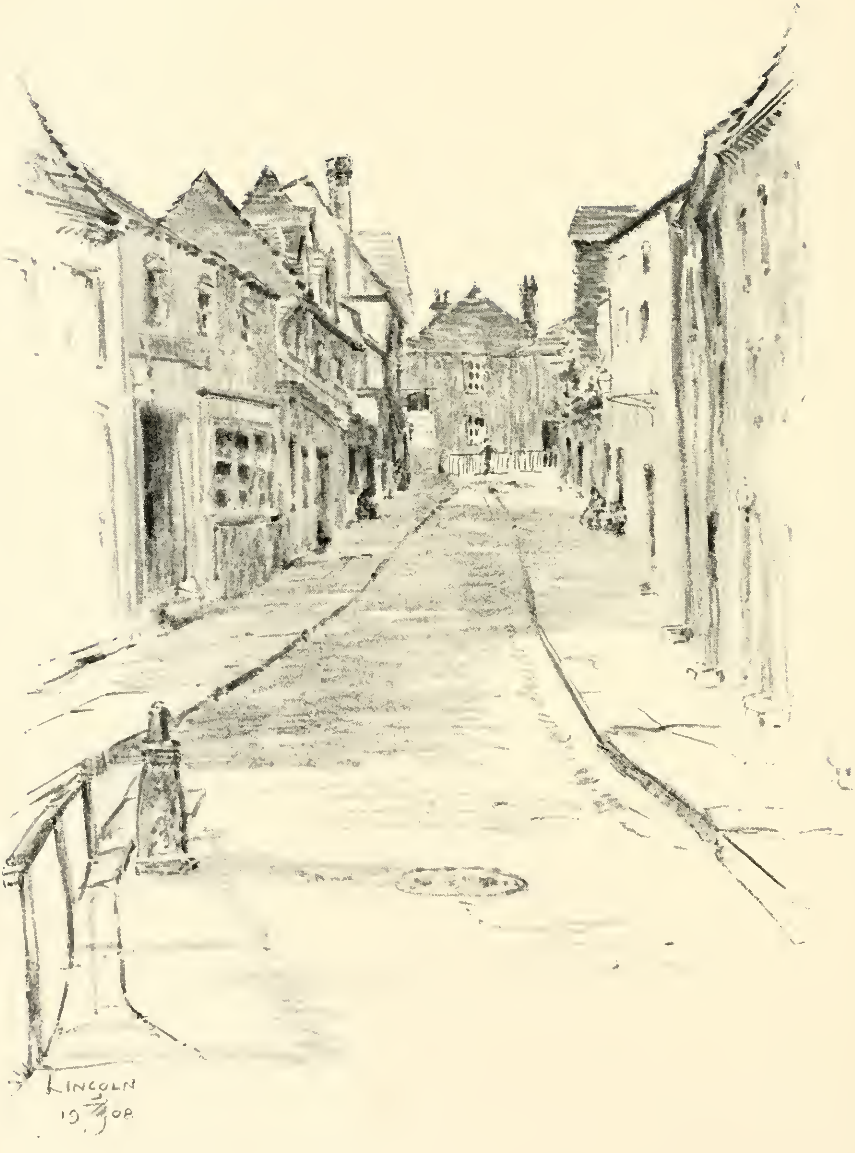
⁂

The beginner will find it wise to postpone any attempt to draw cloud forms until he has had considerable practice in sketching. Not only are the values in the clouds more subtle and more difficult to represent, but the cloud masses themselves change so fast in their position and in their lights and shades, that one must have a quick eye to determine just what shall be placed in the sketch. It is an impression rather than a copy that must be sought. The draftsman of clouds needs especially to remember the admonition to keep his drawing simple. This will require that the foreground and middle distance of a landscape with cloudy sky be rendered in direct and unobstrusive fashion and with few details. The dark masses of tree, rock and earth will then bring out the rounded forms above them.

With these cautions in mind, one may essay to sketch a scene like that shown in the "Maine Hill-top." Only a touch or two of outline is first required to indicate the contour of the hill. The draftsman after studying the flying masses of clouds, should then begin with a 4H or 5H pencil to mass them in, carrying his strokes around the curve of each cloud that the eye may be assisted in understanding the modeling of the forms. A light and swinging touch is required in this, and care must be taken, as in all pencil drawing, that no cross-hatching occurs. Only the lighter surfaces should be modeled in the hard pencil and as soon as these planes are laid in, a softer pencil (2 or 3H), should be employed to complete the modeling of the planes in shadow. Care must be taken to see that the perspective of the sky is preserved. The distant clouds must recede, by virtue of their size and the narrowing of their foreshortened lower planes. If this care is not exercised, the sky will appear flat instead of arched.

With the cloud forms complete, we may lay in the tree masses of the hillside. An F or B pencil will suffice for this, the velvety darkness of the close-packed pines being built up with short vertical strokes, while the slanting reaches of the lighter rock are massed in lighter tones with

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oblique lines which follow the thrust and swell of the hillside. As one was enjoined to "think sand" when drawing sand, so we must now think solid earth while building up the terraces and rocky ribs of such a sketch. It must be remembered that there is an anatomy of a hill, as much as there is of a body or a tree. One must impart this feeling of the underlying framework if one is to make a successful sketch. No sharp accents appear in the foreground of this drawing, for the more prominent the foreground is made the less will be the part played by the clouds above.

❦

While the drawing of cloud forms may have appeared puzzling, the sketching of a scene like "The Steep Hill at Lincoln" will to the tyro seem infinitely more so. The details of every part of the model are so complex, that the question of what to put in and what to leave out, has to be answered half a dozen times over within the space of each square inch. The preparatory outline for the model will have to be made with far greater care than in the case of any of the preceding sketches, and the artist must keep the principles of perspective clearly in mind. The lines of eaves of windows and doors must vanish to the proper horizon and the foreshortening of receding planes be carefully indicated.

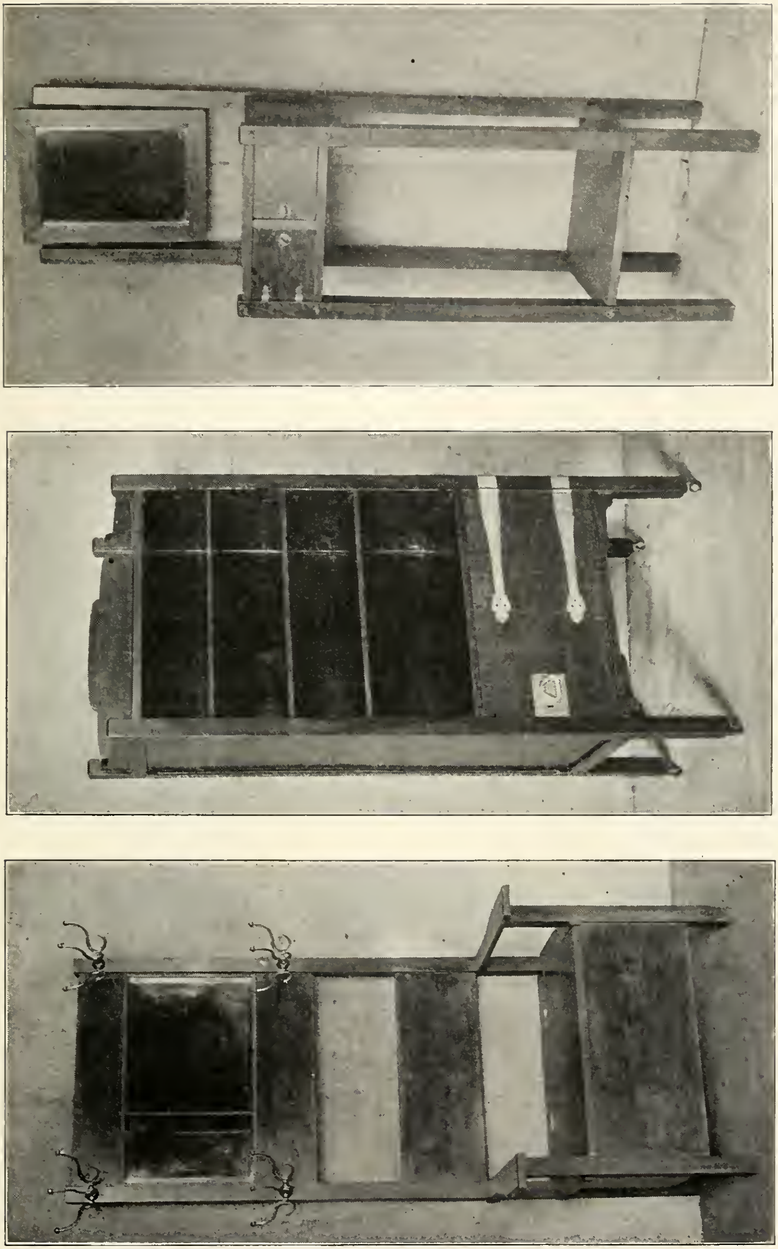
When the main elements of the drawing have thus been touched in with a medium or hard pencil the development of the contrasts about the center of interest may proceed as before. In the present subject this center is a trifle to the left of the center of the picture. Here the timbers, brickwork and roof tiles are seen quite plainly. This detailed drawing is carried well into the middle distance, but loses some of its sharpness as it goes.

Contrast has been secured in the houses on either side of the street by the careful massing of light against dark. This has been aided by the shadow which has been broadly modeled upon the pavement and carried up on the brightly lighted wall on the right side. The doors and windows have been drawn with apparent haste, in reality they have been spotted in with circumspection, a few details of panes and framing appearing near the center of interest, while the nearest windows are merest hints of shadows beneath cap and sill. In the highly lighted house-front upon the right, the introduction of every window would have made a displeasing mass of gaping shadows. Only one or two, therefore, have been shown, leaving the others to be suggested by line and dot.

Careful attention should be given to the manner in which this sketch opens out into the foreground. Where the massed planes cease and the drawing continues merely as line, the beginner is apt to become careless, forgetting that right up to the terminal spot in the foreground he must keep his drawing constructively true. If but a window cap or ledge is shown, the perspective of this must be as correct as that of any other part of the picture. The margins of the drawing must show no aimless lines, but every stroke considered.

The worker will need all of his knowledge when it comes to adding the last few accents upon curb or cobblestone. The temptation is to add too much and so make the sketch "busy" with numerous small points of attraction. Two or three well-drawn details in the foreground will help in giving the picture air and depth. To add more will be to lose the advantage already gained. Simplicity is the first virtue urged upon one who would sketch in pencil. It may be well if we leave it as the final caution.

MADE BY 10TH GRADE BOY, FREDERICK, MARYLAND.



HALL SEAT, MAGAZINE CASE, AND SHAVING STAND, MADE BY PUPILS IN BENCHWORK IN WOOD, MANUAL TRAINING HIGH SCHOOL, INDIANAPOLIS.

A COURSE OF STUDY IN MANUAL TRAINING.—VIII.[1]

CHESHIRE LOWTON BOONE.

THE work for Grade VIII, which is usually the highest one in the elementary school, occupies a rather unique position in the course of study. In a measure many pupils round off at this time the first of study. In a measure many pupils round off at this time the first period of their education, and either leave school or prepare to enter on a second stage in their education—the high school. This does not mean that a special and distinct method should exist for the eighth grade, but that here, the study of preceding years should culminate or crystallize into definite and useful conceptions of economy, management, construction and design. Work in the shop ought to center more on some one phase of construction where pupils may learn principles and find opportunity for invention, and where process becomes a mere tool. Boys at this age are saturated with hap-hazard information about electricity, wireless telegraphy, engines, water-wheels, boats and all kinds of mechanical things, which offer a rich field for manual training. Interest and enthusiasm are already aroused, the teacher has only the task of directing this interest into definite channels of study.[2] The entire year might profitably be devoted to a study of electrical science, beginning with some reading and statements of fundamental theory. There are numerous applied and commercial illustrations available for study. The generation of electrical current and the use of the force to produce motion, as in a simple motor, may occupy another portion of the year, which may end with some additional problems of a practical nature, as the signal bell, telegraph, indicators, etc.

This study should be made as individual as conditions permit. Projects of this kind, to have the greatest intellectual value, should be

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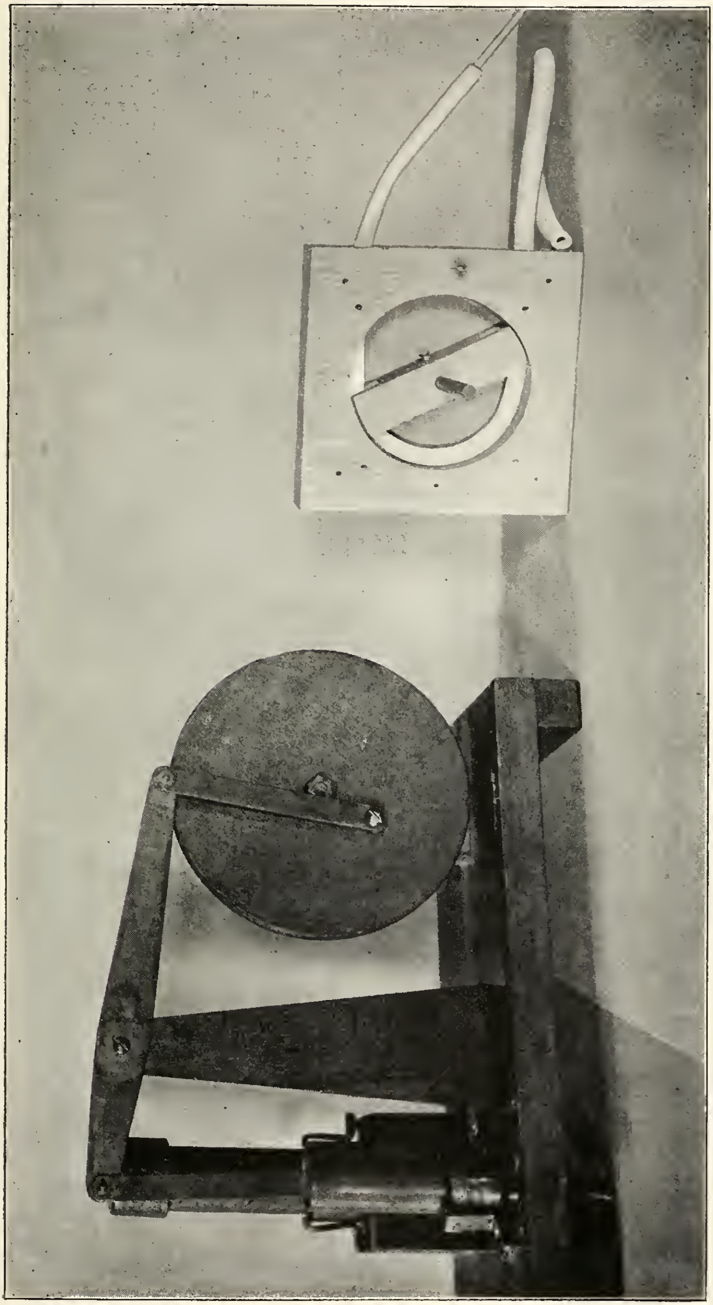
[1] Copyright, 1910, by Cheshire Lowton Boone.

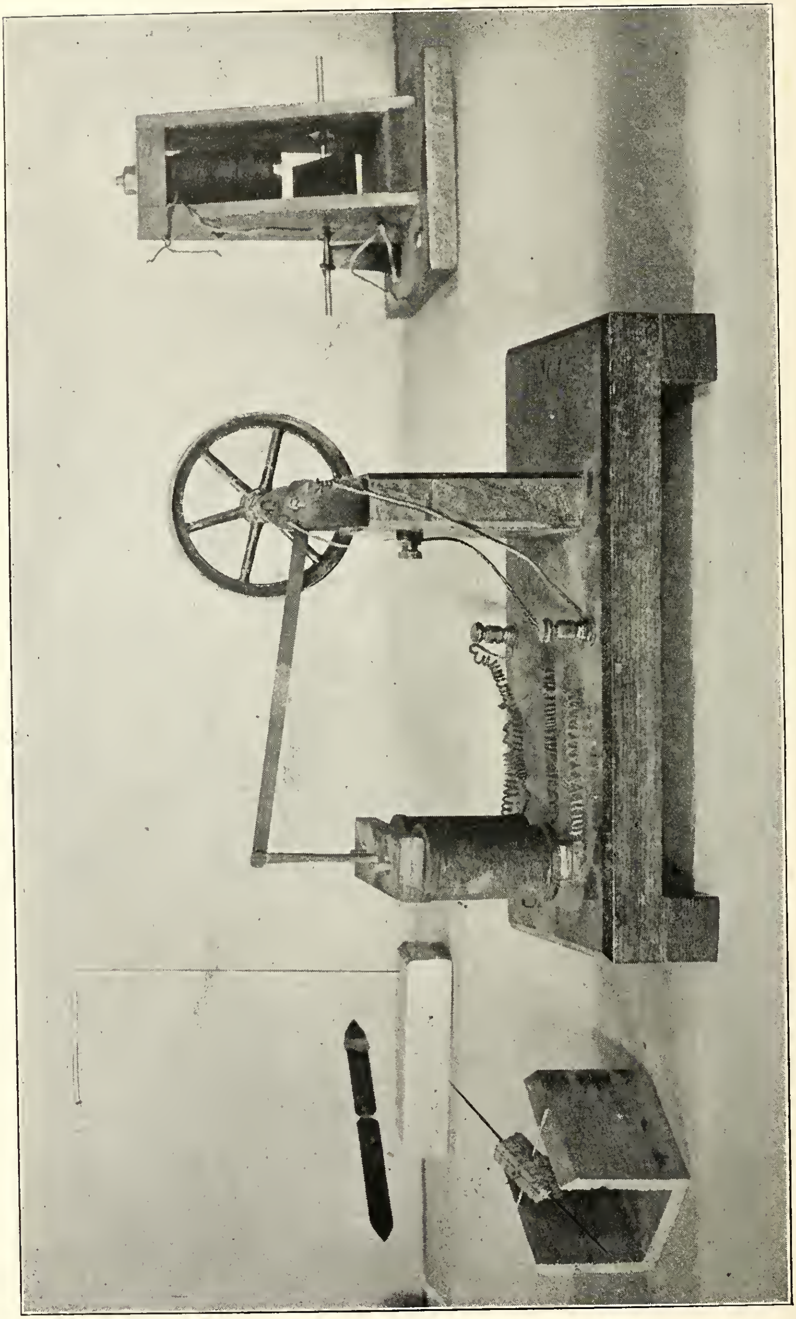
[2] At a recent round table of manual arts teachers, this eighth grade work was up for discussion. Those present agreed that this grade was a troublesome one, and that there was need for some study of it. But strange to say the evening's talk dealt almost entirely with "how to interest boys in woodwork (furniture)." It was the almost universal testimony that good workmanship and knowledge of construction were not common at this time.

These teachers had simply chosen the kind of work for the boys and then sought an effective method of making them do it, instead of seeking a phase of construction in which pupils take a naturally keen interest.

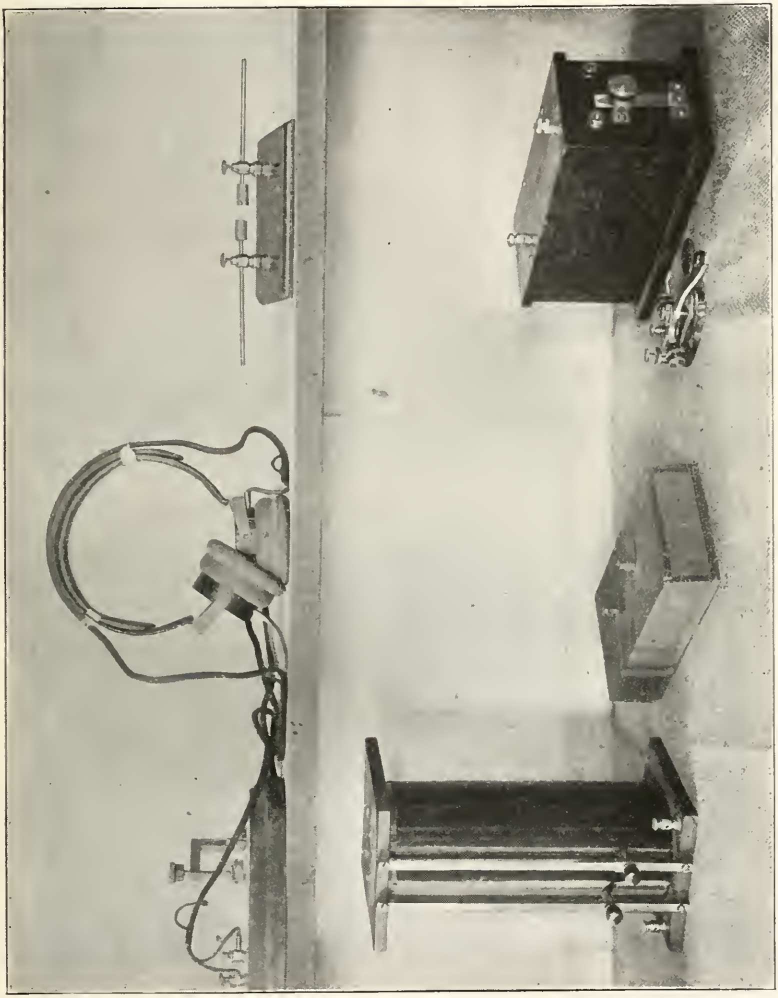


FORCE PUMP.

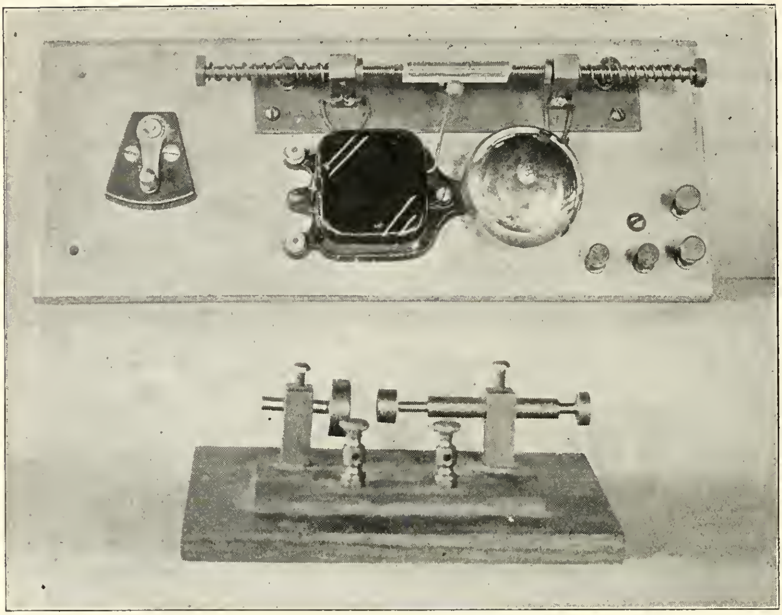
CENTRIFUGAL PUMP.



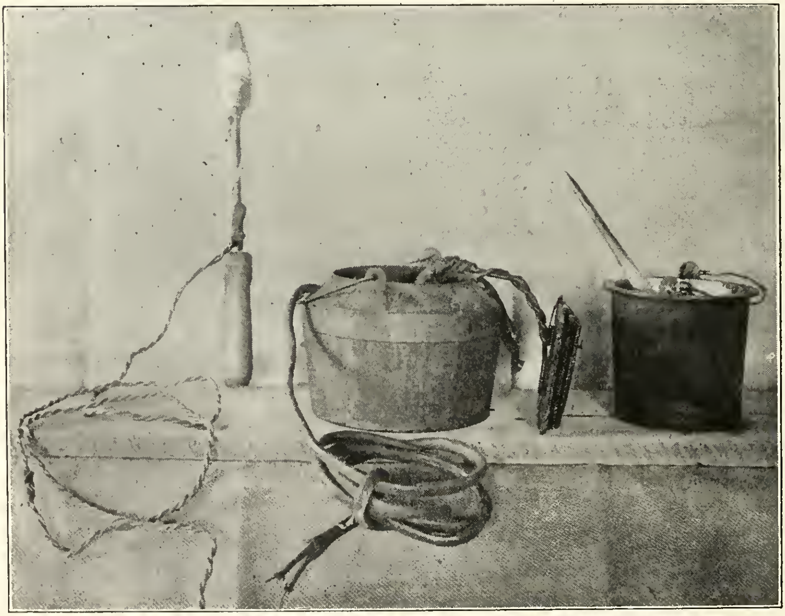
DIPPING NEEDLE; COMPASS; ELECTRIC ENGINE; SIMPLE ELECTRIC MOTOR.



OUTFITS FOR WIRELESS TELEGRAPHY. (UPPER ROW)—DETECTOR; TELEPHONE RECEIVERS; SPARK GAP; (LOWER)—TUNING COIL; CONDENSER; KEY; SPARK COIL. Photo by Sanders Neck, Bloomfield, N. J.



COHERER-DECOHERER; WIRELESS (SILICON) DETECTOR.



ELECTRIC SOLDERING IRON; ELECTRIC GLUE POT.

planned first on paper; mechanical drawing in such cases comes into its own because the pupil needs it. Since many of the problems include constructions and devices which come from the pupil, he must needs show by diagram just how the machine is to be made, for the teacher's inspection and as a guide to construction. These drawings may not be perfect from the draftsman's standpoint, but they must be accurate because they have to represent real conditions. The drawing of a telegraph instrument which would not work can be shown to be worthless.

Therefore in Grade VIII it is well to seek that kind of work which will shift onto the pupil much responsibility of initiating and completing his own plans. This will be a tax on the instructor in every way—if he be not well informed. The shop will need additional equipment for this specialized study. The lathe, forge, blow-pipe, soldering materials, and a few metalworking tools will be found necessary.[3]

There should be connections in the shop by which commercial electrical curent may be obtained for experimental purposes, together with the proper resistance to adapt it to these small uses.

Boys Class—Grade VIII.

1. Electricity.

a. Study of frictional electricity, the magnet and adaptations; compass; dipping needle.

b. Batteries—production of electrical current; the electromagnet.

c. Applications of current to telegraph, telephone, bells, lighting, etc. Some of these should be worked out.

d. Motors—Essentials of the motor illustrated by a number of combinations which, in connection with electrical current, will produce motion.

e. The switch—methods of wiring, connections, measurements, and rules prescribed by underwriters.

The class would not necessarily take the work in the order here indicated, nor would the instructor cover all this ground in talks to the class. The schedule merely suggests the possible range of such work when there are several classes. Aside from a fixed amount of theory and reading, the class might with profit spend the entire year on some one application, as wireless telegraphy, house wiring, or motors.

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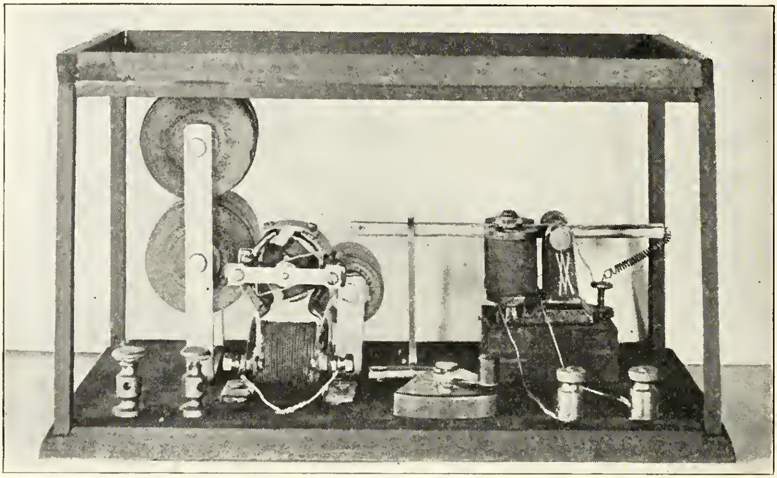
[3] Every manual training department ought to have also a kind of museum of illustrative material. Simple machines (or parts) which illustrate useful principles, electrical instruments, batteries, measuring apparatus, books and pictures, are almost as essential as tools. And the general library or museum is too inaccesssible. This reference material does not cost much besides effort, and is a most profitable addition to the equipment.



SELF-RECORDING TELEGRAPH RECEIVER.

2. Printing.[4] This study which is full of possibilities, may be handled in two ways:
   a. Construction of small presses of wood and metal. This work requires a good deal of skill and care, with much use of metalworking tools. There is room for ingenuity in arranging the press to hold type, wood blocks, etc., and so that the inking operation is convenient. A study of processes of reproduction would be desirable.
   b. Study of Printing as a Craft. In this case a commercial equipment is used and the time is devoted to processes and methods. The work could best be handled in connection with a school paper. Printing offers excellent material for an eighth grade course, if organized in the same careful way as in the case of woodwork. The equipment is not unduly expensive and there is no unsurmountable difficulty about handling classes of moderate size.

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[4] Details of an experiment along this line in Montclair, N. J., will be given in a future paper.

3. Furniture Construction. There are boys who like this kind of work and there is no desire to belittle its advantages. But there are two reasons why it cannot be a standard form of work for the shop. First, it is expensive, and many pupils in the public school cannot afford the individual outlay; and second, it is not the kind of construction which appeals to the average boy. He will at times cheerfully make brackets, bookshelves and tables, if asked to do so by parents or favorite teachers for exactly the same reasons which induce him to cut the grass or clean the blackboards—financial reward or the desire to please the individual. Left to his own devices a boy does not often make furniture.

Girls' Classes—Grade VIII.

The statement concerning girls' classes in cooking and sewing in the preceding paper will serve here. Cooking is probably more important and valuable in Grade VIII than sewing. But whichever one is used, the practice of it should become rather specialized—first, because if the girl leaves school at the close of her eighth year she should possess some real domestic knowledge; and second, if she pursues her education further she will have acquired, with the boy, a systematic method of working which will tell in subsequent study. Both boys and girls need to acquire the habit of doing for a purpose which is worth while, as opposed to the dilettanteism so common in our shops, craftsrooms and kitchens. The production of a beautiful stenciled curtain, or a tasty salad, involves some skill and sense, but if this doing does not help to increase the pupil's sense of color and design or her discrimination in culinary matters, then these efforts lose their value. It should be the purpose of domestic science to give some insight into the management of the household where, so far as cooking is concerned, the meal is the unit, not the dish.

Conclusion.

Manual training is not a medicine or method whereby children can be made to swallow unpleasant, large doses of indigestible arithmetic, science and language. These must and can stand on their own merits. Manual training has its own troubles and its own mission, which is to satisfy the persistent constructive tendency. All children have it in some form and they never become normal or well developed naturally until this tendency is satisfied. Therefore the school must, in discriminating fashion, offer to pupils at critical stages in their growth, those kinds of handwork which will most fully meet the demand for information about processes, materials, and design.

BRIEF HISTORY OF INDUSTRIAL SCHOOLS IN GERMANY.[1]

By A. HAESE.

Translated by BERTHA REED COFFMAN.

IN fixing historic facts concerning industrial education one must first take into consideration that the establishment of all schools leads back to the newly arising needs of culture. If one would promote any influence for culture in order to secure certain results, he must begin with the youth. Culture influences of a definite character seldom arise in one isolated locality, they are not discovered in one province only, but they underlie a natural assimilation of culture of peoples bound together by the same economy. Whenever in one place the necessary forces are brought together to form an exhibition of culture, then in other lands similar forces will be found working. Under the pressure of these forces we recognize the achievement of the other land as a model. One people, one state, hastens to keep up with the other in peaceful rivalry for achievement, and becomes a model for the other. This truth is proved by the following fact: Altho the motive for founding industrial schools in the highly developed culture of France from the sixteenth to the eighteenth centuries is not quite clear, yet the founder of the *école normale* at the end of the eighteenth century asserted that France had much to learn from foreign countries, that it must found industrial schools with a new aim in public instruction, in order to free the French nation from dependence upon foreign industry. In almost the same words the demand was repeated in England, Austria, Germany, Holland, Switzerland, Denmark, Sweden and Norway. In each land a new unfolding of strength for the rising wave followed the decline. May Germany long keep the high point of development which she now holds with reference to the system of industrial education, so that she may be a potent factor in the coming assimilation of culture.

In the founding of schools which grow out of new needs of culture, there appear first of all only strong contrasts. The contrast between high and low finds its expression in the middle ages in the almost simultaneous founding of universities and public schools (*Volksschulen*).[2]

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[1] This article is an excerpt from an article entitled *Zur Organisation des gewerblichen Schulwesens* by the director of the Fortbildungschule at Charlottenburg.

Gradually the needs of culture became more refined on account of depth and advancement in knowledge. From the centers of power lines branched out reaching both upward and downward. There arose intermediate steps including all kinds of schools. The university received a preparatory school in the *Gymnasium;* from the *Volksschule* arose *Mittelschulen* (secondary schools) and *Bürgerschulen* (schools for the middle classes.) Parallel to these developments were those which arose in the system of industrial education. The academy of art and the general Sunday school for review and continuation of the studies of the *Volksschulen* occurred first of all in the system of industrial education. Gradually the intermediate steps appeared.

The stream of culture to which the founding of industrial schools carries us back arose, in contrast with the scholasticism of the middle ages, out of realism and the blossoming of the natural sciences. As intellectual leaders of the movement, may be mentioned Bacon of Verulam in England, Descartes in France, Rattich in Germany, Comenius in Austro-Hungary, and Giordano Bruno in Italy. Parallel to this influence was an economic one which we call *mercantilismus* (commercialism.) If commercialism should fulfill its goal in directing industrial activity toward home industry in order to secure a favorable balance of trade with the foreign country, then no other way would remain than that which we recognize in the characteristic activity of the Great Elector: model home arrangement, model workshops, advancement of the culture of the people, especially of the industrial workers. As a result of these influences, we notice the lasting effect in the founding of *Volksschulen;* and in the domain of industrial education, the founding of the Academy of Art at Berlin in 1696, after the models of Paris and Rome, is of greatest significance. The Academy of Art had the avowed purpose of serving the industry and artistic handwork of that time. This institution became the model of those in other large cities, such as Vienna, Copenhagen, Stockholm, etc., which followed at intervals. Along with the academies of art, and in strong contrast with them, there grew up universal Sunday schools for elementary education which first served religious purposes, then supplemented the knowledge acquired in day schools, and finally broadened and deepened that knowledge. Important govern-mental regulations, from which has arisen the system of elementary industrial schools, may be mentioned, the Evangelical school regulations of Würtemberg in 1739, the general regulations for country schools in Prussia in 1763, the electoral regulations of Bavaria in 1771, and the general school regulations of Austria in 1774.

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[2] This term has no exact equivalent in English. For this and a few other expressions the German words will be used in this article.—*Translator.*

At this time new movements arose both in the intellectual life of the people and in the economic domain. The time of the so-called Era of Enlightenment came. The point of view of utility governed the range of observation both of the philosophers and of the majority of the people. Utilitarianism claimed the upper hand. In the field of education the most prominent men in this movement were Basedow in Germany and Rousseau in France. Along with these movements grew also a new economic impulse. Along with handwork, publication and manufacturing were developed. The great undertaking made its beginning, especially in England and France, and brought with it new forms of economy and business. The economic movement, which arose from these causes, is known as the *Industriesystem*. Its most prominent leader, Adam Smith, in his book, "Nature and the Causes of the Wealth of Nations," in 1776, not only laid down with unusual clearness the foundations for insight into economic work, but he preached to the people vigorous self-help in the domain of economy and culture. All these circumstances had again a significant effect upon the system of industrial education. Practical utility and the development of those who do handwork, constituted the goal for which they were striving.[5] Worthy of mention at that time were the regulations of Catholic schools for the lower grades in Schleswig in 1801, the electoral regulations of Bavaria in 1803, the founding of schools in Copenhagen in 1800, Altona in 1801, Göttengen in 1813, Würtemberg in 1818, etc. In England the same movement began with the establishment of courses for hand workers in Glasgow in 1800. Austria in 1816 made review courses on Sunday obligatory. Along with religion, arithmetic and writing, drawing also had its place in these Sunday industrial schools. In Austria, even in 1782, by a court ruling, the importance of drawing was shown.

The academies of art and the Sunday industrial schools formed the frame-work of organization out of which the system of the industrial continuation school (*Fortbildungsschule*) developed. The intermediate steps which gradually arose in this kind of schools are to some extent influenced by the general schools which were developed along with them. It was natural that the realism, previously noticed, and later the utilitarianism had to influence the *Volksschulen* and the scientific schools. August Hermann Francke introduced into the Francke institutes as early as 1700 instruction in practical work. The Orphans' Home had to sustain itself. On that account the work done by the pupils was used not only to serve the purpose of industrial development, but at the same time that of profit. That was characteristic of orphans' homes, first of all, for in the year 1724 we find in the Military Orphans' Home at Potsdam the same arrangement—an extended course of instruction in work. After the orphans' homes, instruction in handwork for a trade was introduced into special schools, so-called trade schools or work schools. In 1727 there was founded at Potsdam a school for spinning, the products of which were sold. This thought gained entrance in Berlin in the middle of the eighteenth century, and in Hanover at the end of the eighteenth century. The pedagogue Kindermann had learned to know the industrial schools in the Francke institutes. To him belongs the credit of carrying this idea into Austria. Even tho several schools for spinning were established in Bohemia in 1755, modeled after the German pattern, yet the founding of so-called trade schools in connection with the *Volksschulen* did not occur to any great extent until it was done thru Kindermann's activity. The trade schools have not been able to enjoy a lasting effectiveness. The main thought of the practical work has remained, to be sure, but it has taken on other forms, since it has been turned to instruction in skill of hand and workshop methods.

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[5] The Sunday schools began to take on a more technical character; they were given the special task of training apprentices, journeymen and farmers.

Along with this practical attempt has appeared a more theoretical one which cannot be overlooked in gaining an understanding of the whole school development. It also leads back to realism. Again it was August Hermann Francke, who in 1700 introduced the exact sciences as subjects for instruction in the teaching plan of the schools. Aroused thru his ideas, Christopher Semmler in Halle undertook to make the school instruction especially fruitful for industry. In the year 1705 came his proposal to train the pupils of the last school years in technology, applied mathematics, geography, and drawing. This would be done at the conclusion of the formal instruction of the day. With scanty means the school opened in 1707, but soon had to close on account of lack of funds.

The great and valuable ideas of Francke and Semmler were taken up in the same place by another school man, Julius Hecker, with great enthusiasm. Later he employed his activity in Potsdam and Berlin. His first work in the year 1739 consisted in changing the plan of instruction for the *Volksschulen* somewhat so as to take into consideration practical life thru the introduction of the fundamentals of business and the trades. The continuation of the Semmler idea seemed to him of especial value. In spite of all anxiety lest the school should suffer the fate of Semmler's, he founded, in 1747, the *Realschule* (scientific school) for business and trades. Here mechanics, architecture and physics were taught and instruction was offered in the science of manufacturing and commerce. Thoro training was given in the popular sciences and drawing, in order to prepare, theoretically, for the trades. As a result of the example of Hecker, there was founded in Austria in 1804, a *Real-und-Bürgerschule* in which the pupils were to be prepared for the arts, business, farming, or public offices. In a reorganization in 1851 these *Realschulen* were divided into two kinds, those for general culture and preparation for the university, and those for technical training of students who wished to devote themselves to business or the lower ranks of industry. Since 1867 technical training in the *Realschule* has been discontinued. To take the place of it, industrial schools were founded, and the *Realschule* became a preparatory school for the university. In other countries the *Realschule* has had a similar development.

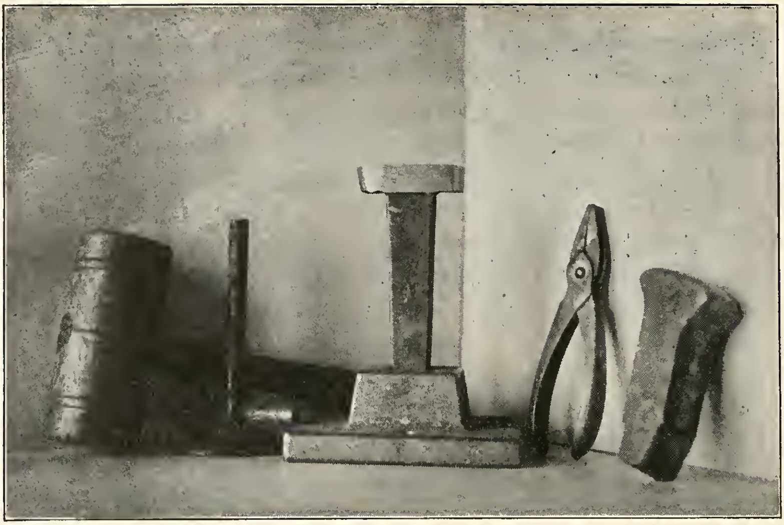
Up to this time, Prussia was in the lead in ideas for founding schools, but from this on Austria and Southern Germany were more in the foreground. Along with the *Realschulen,* with their general cultural and technical plan of instruction, there came the founding of Sunday special schools for hand workers of different trades. In Austria these were called industrial schools. In the school for handworkers an opportunity was given the pupils to study Sundays and evenings without any interruption in their work. The founding of such schools progressed very slowly during the fifties and sixties. This was because *Realschulen* had at one time been regarded as the real place for industrial training and an effort had been made to make the evening and Sunday schools so far as possible subordinate to the *Realschulen.* The leaders of the *Realschulen* regarded the school for handworkers as subordinate to their own schools. With the transformation of the *Realschule* into an institution for general culture the need of organizing the industrial schools into independent institutions became urgent. Moreover, the trade regulations of Austria in 1859 laid upon the employer the duty of providing for his apprentices the instruction prescribed by law, or as a substitute for this, insisting upon attendance at an industrial trade school. But only in a few large cities did the industrial associations found such technical schools. In 1869 there appeared the Austrian school law which demanded industrial continuation work for school children and left it to the choice of the local authorities to arrange technical courses according to the needs of the place. As this stipulation was not binding, but little use was made of it. More potent was the law of lower Austria of 1868 with reference to the establishment and maintenance of the industrial continuation school. But these schools continued only until the pupil was fourteen years old. By a law of 1873, however, the industrial preparatory courses in Lower Austria became compulsory. As a result of this came an intensive movement in the founding of schools.

The industrial system, patterned after England and France, caused especially the founding of art and drawing schools. After 1800 Austria and Germany turned their attention to drawing. The great emphasis placed upon instruction in this subject characterizes the system of industrial schools of the nineteenth century. The lower industrial schools were very closely united with these. Constantly incited anew, the art and drawing schools were favored in their development. To be sure, the flourishing provincial art schools in Germany were greatly injured by the wars at the beginning of the nineteenth century, but by 1820 they had acquired new life thru their English pattern and their renewed power of activity. Yet the forces behind the movement were not enduring enough, and in 1851 Germany was forced to realize at the World's Exposition in London that she stood far behind other countries—that in her industry there was little art to be found. "Artistic Taste" became, then, the prevailing watchword for the industrial schools. Unfortunately they did too much of a good thing and shot clear past the mark. Exterior decoration became the principal purpose. That they had to remain behind other lands on account of their exaggeration and alienation was only too plain. The World's Exposition of Vienna in 1873 and the Art Exposition in Munich in 1876 showed the Germans their failing, especially in comparison with their sister country Austria. At that time Lessing wrote his severe judgment concerning the "sad development in industrial art" which fired Germany with a new zeal for handwork. Industrial art museums and schools were founded, and those already in existence were reorganized. A considerable number of the larger cities of Germany agreed to the opinions of the Prussian memorial of 1879, and between 1880 and 1890, founded the so-called "Schools for Industrial Art and Handwork." The improvement of instruction in drawing was now considered the most important task. Every person pursuing a trade should become a thoroly competent designer in order to exalt industrial art. That every one doing handwork might belong to this movement was shown by the added name, "Handwork." Austria had proved in the expositions that its school system was exemplary. Scarcely had this energetic movement shown favorable results in the schools for industrial art and handwork when a new power came to their help—the modern art movement from England. New schools for industrial art and handwork were founded, and the condition of these schools was extremely favorable for their development.

Along with this principal and fundamental movement toward schools for industrial art and handwork, another one arose, which in proportion to the numbers of those interested in it, far surpassed that of the industrial art. Steam and iron created a new land of economic activity. Free competition and business on a larger scale closed the way to a good income and high position for the industrial worker. In any case training was necessary for him to climb the heights. In great numbers the trade workers streamed into the industrial art schools then in existence, for these were the only schools at hand to satisfy the sudden demand for opportunities for training. The factory operative entered the industrial art school, and the schools remonstrated, insisting that they still had in mind the person who did handwork, especially artistic handwork. In order to quiet the agitation resulting from this change in conception of purpose, machines and instruments were "drawn" and were often ornamented with artistic adornment. Gradually they became accustomed to the idea that they must regard this foreign element in the organization of the school as a wholly necessary part of existence of the school of industrial art and handwork. Already new appearances were being noticed in economic life. The great industrial undertakings brought the workmen in factories together in great numbers to form a centralized force. The rise of the workmen to independence or to higher positions became more seldom. Crises and economic disagreements brought about organizations of workmen.

Social problems suddenly stood foremost in economic life. Along with this change came the failures of Germany in the industrial world, which Reuleaux in his severe judgment sums up in the expression "cheap and poor." All these circumstances could not be without influence upon the system of industrial training. The social conditions made it necessary that the industrial workman should learn to value himself as a man, and the employers recognized that only the intelligent industrial workman would be of value in competition with the foreign countries. At the same time the experiences with the voluntary Sunday schools for apprentices and journeymen were not satisfactory. From the knowledge of all these facts there grew the idea of independent schools for industrial workers in the broader sense, with the distinguishing characteristics of compulsory education. Even in the beginning of the nineteenth century Bavaria, Baden, and Würtemberg had made a compulsory education law for apprentices, but for permanent effect this idea availed as little as the same restriction of the Austrian industrial regulation of 1859. The effective movement for the idea of compulsory education was put into operation with the industrial regulation for the North German Confederation in 1869. It was not made simply for the person who does handwork, but had in mind the new "industrial workman." During the political and economic prosperity between 1872 and 1876 not less than seven German provinces, as well as Lower Austria, passed a compulsory education law. After having attained this remarkable height, the wave of development receded again for a space of twenty years. Then the State and the large German cities began to direct their interest more to social-political problems, especially to the system of industrial education.

The new period now begun in Germany depends less upon the laws of the provinces than upon the restrictions of the national industrial regulations. Those provinces which have declared for a compulsory education law for the industrial youth, must enlarge the limits as much as possible and make the requirement general. The system of industrial development as the foundation of our economic worth, both at home and in our position in the world, can never be the task of the smaller circles of those concerned; it belongs to the fundamental tasks of the general state and national government.



ADDITIONAL TOOLS REQUIRED TO MAKE THE WORK SHOWN IN THE PHOTOGRAPHS.

METALWORK—WITH INEXPENSIVE EQUIPMENT FOR THE GRAMMAR AND HIGH SCHOOLS.—II.[1]

ARTHUR F. PAYNE.

BESIDES the tools that were illustrated in the April number we shall need, to make the articles shown in the photographs, the following new tools and equipment:

Base-plate, No. 151 F, at 40 cents.
Lapping-stake, No. 157, at 75 cents.
Smoothing-stake, No. 153 H, at 40 cents.
Wooden mallet, No. 91, one flat and one round-face, at 25 cents.
Pliers, No. 106, at 15 cents.
Bunsen burner, No. 1135, at 30 cents.

This equipment is all shown in the photograph. The Bunsen burner has an adjuster at the bottom so that we can get a blue or yellow flame just as we desire. The base-plate is usually fastened with screws to the top of a bench or table, and is used to hold the lapping-stake firmly while bending over the ends of the blotters, and sides of the blotting-pad corners and lapping over the edge of the book-ends; the mallet is used to bend the metal over and flatten out or beat up the work as needed; the Bunsen burner may be used to do the soldering on the hat-, tie, and belt-pins, also the cuff-links mentioned in the April number, and will also be used to obtain various colors on the copper, the process of which is described on the following pages.

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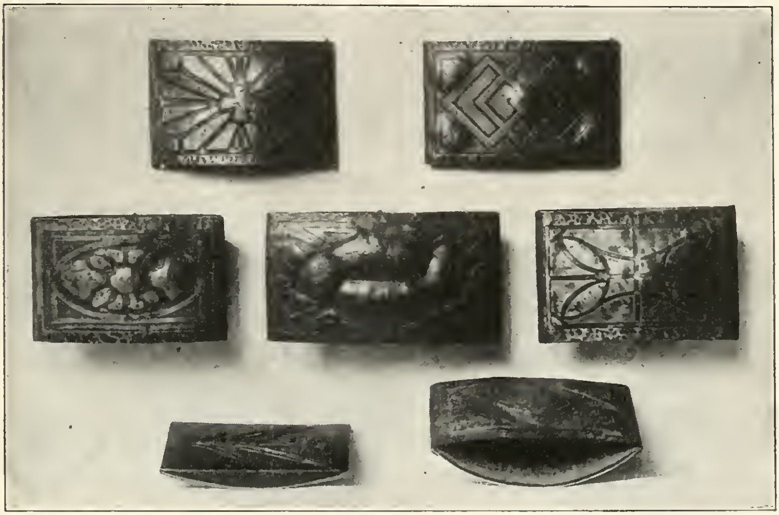
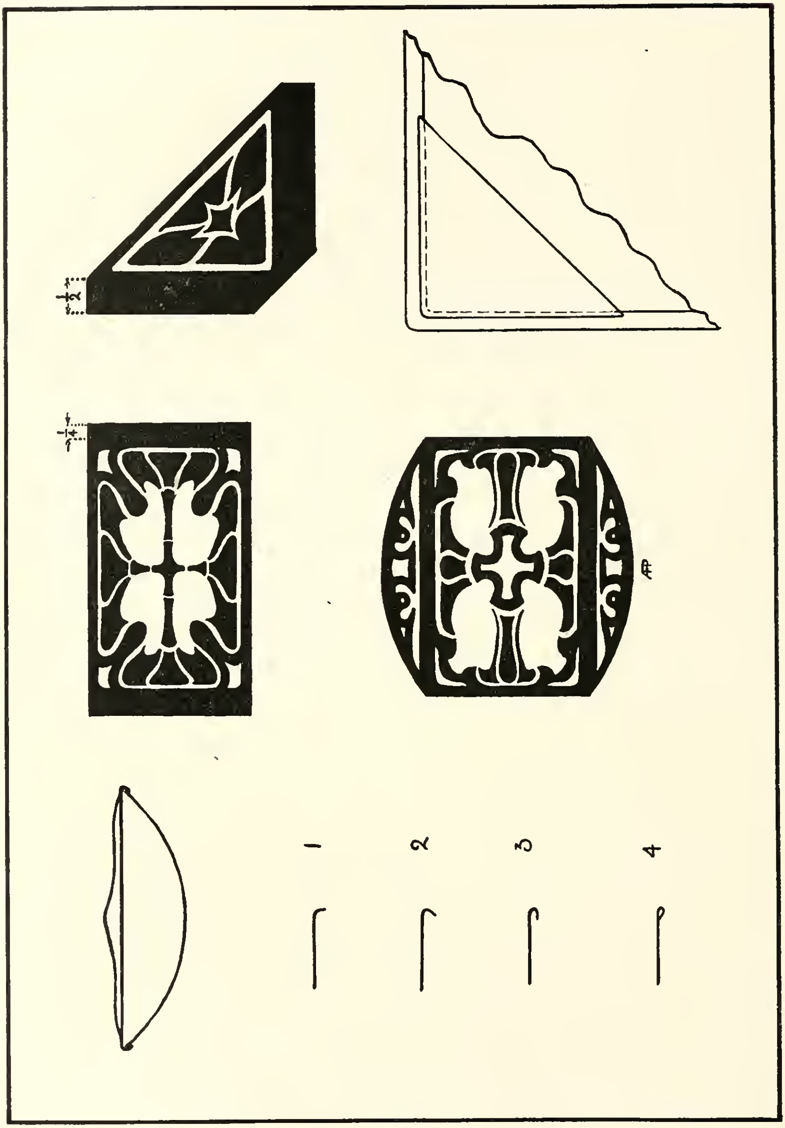
[1] Copyright, 1910, by Arthur F. Payne.

The next problem in the graded series that we are following is that of the blotter. For this we shall require one piece of soft copper or brass, 18-gage (Brown-Sharpe gage) 4½ inches long by 2½ inches wide for the top and one piece of spring brass, gage 20, exactly the same size, for the bottom. The construction of this blotter is shown in No. 2 in the photograph and it is made in the following manner: First, paint the design on the top as usual, with the Sapolin, but with this difference, that we must allow an extra ¼ inch on each end for turning over as shown in the drawing; then etch in the acid solution and remove the Sapolin in exactly the same manner as outlined in the previous article, beating up the design from the back on the block of wood with the ball end of hammer, getting it as smooth as possible by hammering the design on the smoothing-stake (which will fit in the base-plate) with either end of the hammer, then place it flat, design upward on the lapping-tool allowing the extra ¼ inch on the end to project over the edge and with the flat end of the mallet bend it over the edge as shown in the photograph, until it is about the same as shown in the drawing,



BLOTTER.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being careful that the turned over end is at right angles to the sides. Then proceed to color and finish in the following manner: Clean well and polish bright with a piece of old emery cloth or better still with No. 2 steel wool which may be procured in ten-cent rolls at the hardware stores, remembering when coloring with heat in this manner never to allow the fingers to touch the polished surface; whenever it is necessary to handle it do so with a piece of clean paper as the finger marks will show on the finished work.

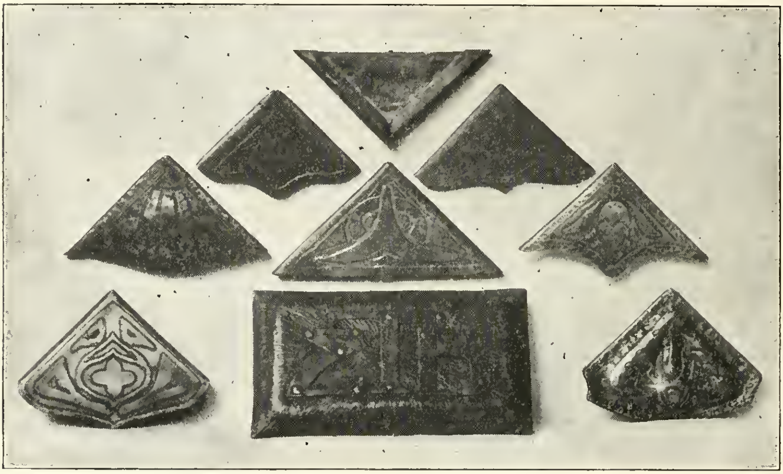
BENDING THE END OF THE BLOTTERS.

Now light the Bunsen burner and regulate the flame with the adjuster at the base so that the flame is blue with a small yellow tip, then hold the blotter with the pliers in the flame so that the yellow tip just touches it, passing it slowly in and out of the flame, occasionally changing your hold with the pliers as the copper will not color under them; after a short time the copper if it has been polished bright and clean will change thru the various colors in this order, varying a little under different conditions:

1st. Orange red.
2nd. Bluish-purple.
3rd. Brassy color.
4th. Dark red.
5th. Deep purple.
6th. Iridescent.
7th. Chestnut.

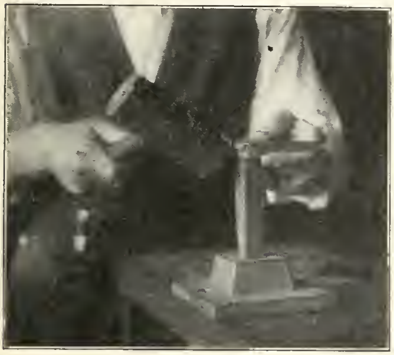
The first two colors sometimes come off when we apply the finish so that the best colors are Nos. 4, 5, 6, and 7. If you hold the copper in the flame too long, that is beyond the chestnut color, the color will all flake and rub off, so that it is advisable when coloring for the first time to get a small scrap of copper and polish it and color it in the flame so that you will know more readily when the right color has come. If it happens that the color does not suit you or you carry it beyond the chestnut color and it flakes off, we can remove all the color and clean the copper by immersing in a solution of one part sulphuric acid and three parts water in a glass or earthen dish. This solution may be used cold but will work quicker if slightly warm. Allow the copper to remain in the solution ten or fifteen minutes, then remove and rinse off in water and clean and polish with the emery cloth or steel wool and color again. When using the sulphuric acid solution care must be taken to allow none to get on the clothing; it will not hurt the hands providing they are immediately washed off in water. When you have obtained a good color, allow the work to get perfectly cold, handling it as little as possible and then flow on the banana oil and allow it to dry.

Next, cut a piece of blotting-paper the exact size of the piece of 20-gage spring brass, hold them both together and place one end of the brass and paper under one end of the top, and bend and spring the other end, under the other end of the top, and the brass will take the shape shown in the photographs and drawing. Sometimes if you have bent the ends of the top over more than ¼ inch the brass will be too long and take too sharp a bend; this is easily remedied by making the brass shorter, cutting a little off one end, and the blotter is finished. Remember that we can only color copper by heat; if the blotter top is of brass, color with the verde green or butter of antimony as described in the April issue.

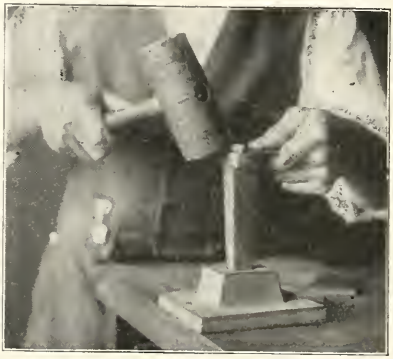


DESK-PAD CORNERS.

If the students have woodworking as a part of their school work or have access to woodworking tools at school or elsewhere, they can easily make a blotter like No. 1 as shown in the photograph. This requires a piece of 18-gage soft copper or brass, cut out as shown in the drawing. Punch the holes for the tacks and paint in the design, which in this case may also be on the side as shown in the drawing, and etch while the metal is flat, then bend over the sides with the mallet on the lapping-tool, color and finish. Now make a soft wooden block to fit tight inside of the top and cut the blotting-paper the same width as the wooden block but an inch longer on each end, fasten these ends to the top of the block with small tacks being careful to draw the blotting-paper tight. Then squeeze the block into the metal top and fasten it there by driving thru the holes in the sides, four copper tacks which may be bought at almost any hardware store. These blotters may be made more elaborate by making and riveting knobs and handles on the top, but as this would require more tools and equipment, we will not take these up until a later issue.



BENDING THE DESK-PAD CORNER. NO. 1.



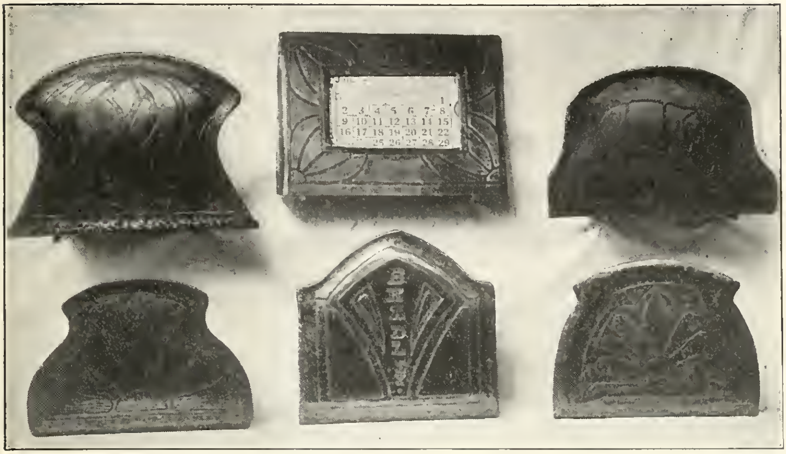
BENDING THE DESK-PAD CORNER. NO. 2.

The next problem in order is that of the desk-pad corner. The size may be from 2 inches to 4 inches along the side, with ½ inch allowed on each side to turn under, as shown by the topmost of those in the photograph. The method of laying and cutting out is shown in the drawing. The four corners may be laid out, the design painted on with Sapolin, and etched all on one piece of metal and then cut out. Now bend over the two edges over the lapping-stake with the mallet, as shown in the photograph, in exactly the same manner as in making the blotter, being careful to keep it square; then place it face down on top of the lapping-stake or on the bench-top or flat piece of wood and bend the laps down until they are parallel with the top with space enough between to allow of the insertion of the blotting-pad. Sometimes the metal gets hard in this bending process, especially if you do not get it just right the first time and have to bend it back. If it does at any time get hard and difficult to bend, light the Bunsen burner and adjust the flame so that it is blue without any trace of yellow and anneal the metal by holding it in the flame until it gets red hot, which should take about three minutes; then plunge it in cold water and you will find the metal soft again. Then continue to bend until it is right.

When you wish to clean a piece of metal that has been in the flame it is always best to immerse it in the sulphuric acid solution and rinse in water, then polish and color by any of the previously described methods and finish with the banana oil to retain the color. The desk-pad may be bought or made—the kind that is made of two pieces glued together, the bottom piece ¼ inch larger all around than the top piece, is the best. To fasten the metal corners to the pad, loosen the corners of the pad with a knife, put a little of LePage's glue inside of the metal corner and push it on the top pad, then glue the two pads together again and allow to dry.

BENDING THE BASE OF THE BOOK-END.

The book-end is the problem next in order. It requires a piece of 18 gage soft copper or brass 7 inches long by 6 inches wide. Of the 7 inches in length we use 4 inches to etch the design on and 3 inches to turn under at right angles for the base. We also allow ¼ inch all around the edge of the design for lapping over as may be seen in No. 1 in the photograph. Lapping the edge in this way is not difficult, and makes the book-end stronger and gives a smooth edge. After the design is put on and etched (a large photographer's glass developing tray is best to etch book-ends in) and the Sapolin cleaned off, then with the shears cut off the surplus metal, remembering to allow the ¼ inch extra for lapping over. Then on the lapping-stake which has straight and curved edges for straight and curved outlines, lap over the edge, following the steps as shown in the drawing. Lap all around the edge smooth like No. 1 in the drawing; then a little more, like No. 2; then turn it over and lay it design down, on the bench or on a block of wood and hammer it down like No. 3; and finally on the smooth surface of the lapping-stake beat down the edge lightly with the ball end of the hammer like No. 4, as smooth as possible. Next beat up the design on the block of wood in the same way we did in the preceding problems; then hammer the design carefully with either end of the hammer on the smoothing-stake, the object being to get a smooth uniform finish all over the book-end. Now place the book-end design upward on the edge of a bench or table with a sharp corner, allowing the bottom part that is to be turned under to project over the edge, and bend it down at right angles to the design part, with the hands, as shown in the photograph, and make the corner sharp and smooth with the mallet;


1
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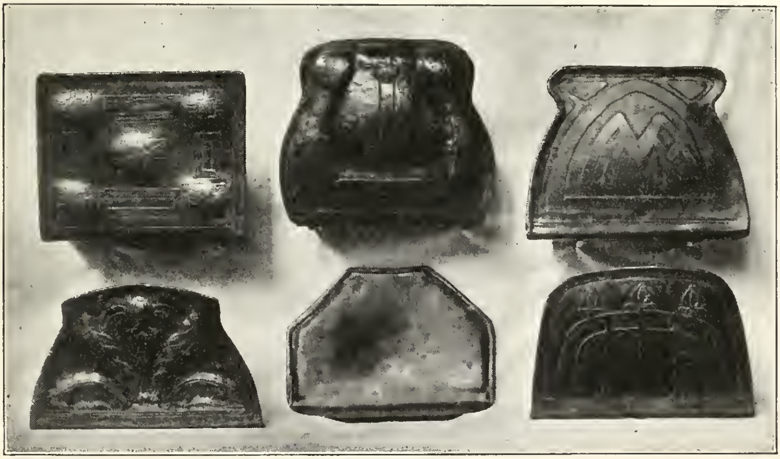
BOOK-ENDS.



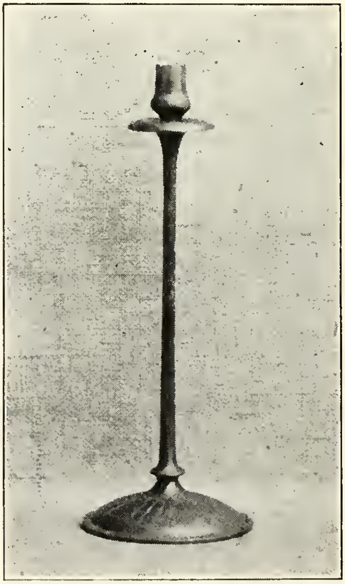
BOOK-ENDS.

color by any of the previously described methods and finish with the banana oil.

It has been suggested to the writer that he introduce into this series of problems in metalwork, certain problems using extremely thin metal fastened together with soft solder, after the style of the so-called punched brass work that at the present time we find in such large quantities in the cheap department stores. In this class of work there is no art, and very little skill and practically no effort required, and the articles when finished are fragile and in the greater number of cases, if one were to use them for the purpose for which they were made, they would fall to pieces or collapse.

One of the main objects of this series of articles is to displace such work and in its place give problems requiring simple equipment and easily understood process, but still showing the value of careful, painstaking work; and in the finished object, no matter how simple, to present an article that is suited to its purpose, made for use, durable, and, we hope beautiful.

(*To be continued.*)



FROM ILLINOIS STATE REFORMATORY, PONTIAC.

DR. HANEY'S CONTRIBUTION TO THE TEACHING OF THE ARTS.[1]

JAMES L. HUGHES.

A DISTINGUISHED visitor from abroad once asked me in what city of America he could see the best manual training work in the public schools. I replied very promptly, "See that developed by Doctor Haney in New York." "Oh, dear, no," said he, "I have seen that but it did not appeal to me."

I inquired what standard of valuation, or what elements of power, skill, and character he took into consideration in deciding the relative excellence of systems of manual training, and he replied: "Definiteness, absolute accuracy of construction in the articles made." He proceeded to discuss the value of training a child to do his very best at all times in order to develop the habits of accuracy and definiteness as a basis of reliability in character.

As soon as I found an opportunity I told him that I had long recognized the importance of producing as perfect an article as should be expected from a child, not only in aiding to form the characteristic of trueness, but in developing a tendency toward more perfect ideals; but that accuracy is only one element of character, and that Dr. Haney's system of manual training aimed to develop every possible element of power, skill, and character, and not a single element.

I reminded him that no part can be as great as the whole of which it forms a part; and that mere skill is the least important of the three great elements, power, skill, and character, in the development of a child. I tried to show him that it is as unwise to direct a child's attention mainly to producing perfect models in manual training, as to try to compel him to make one drawing absolutely perfect before allowing him to proceed to make a new one; or to make him correct and re-write, and correct and re-write a composition until it is a perfect model of English. It is sometimes true that a certain advantage may result from such a course, but the advantage is secured by the sacrifice of infinitely higher things. Such training secures accuracy at the expense of the child's originality and interest. It magnifies the value of form rather than content. It dwarfs imagination, and intuition, and personality, and executive power, and achieving tendency, in order to secure mechanical perfection of form.

There have been three stages in the development of modern educational ideals. In the first stage knowledge alone was considered, in the second stage the disciplining of the child's character was the aim, and in the third the development of the child's individual powers, his skill, and his executive character, is the supreme purpose. The first ideal was storing, the second discipline, the third development.

Men in modern times considered knowledge only at first in discussing education. A higher view was taken by Locke and Herbart, who regarded knowledge not as of supreme value in itself, but as a means of transforming character and molding it in harmony with the ideals of the most advanced teachers and thinkers. A much higher and clearer view was revealed by Rousseau, Pestalozzi, and Froebel, who regarded the development of the child's selfhood as the vital ideal in education. Men have passed or are passing thru similar stages in regard to manual training, art, composition, and all the productive departments of training. At first the perfection of the product was the only thing considered. Then the perfection of the product was considered as a means of influencing elements of the child's character, especially trueness. The highest ideal yet revealed in regard to the influence of productive or constructive work is that it is a process of expression to develop selfhood. The process is of greater importance than the material product. The complete development of the child is an infinitely higher ideal than the perfect development of the article he is trying to make.

A system of manual training should form the basis of an educational system whose results cannot be fully tested by any kind of school examinations, nor by any book tests, or knowledge tests, but by power tests, skill tests, and character tests. The true manual training system is concerned in the making of the most perfect individual possible, not the most perfect model possible. It is not planned to influence or develop certain elements of character combined with skill, but all the possibilities of power, skill and character that can be developed by productive and constructive processes of expression. It is not a course of work which shows perfect models to children and trains them to persistent efforts to reproduce them perfectly, but a course by which each child is guided in the development of his original individual powers by constructive expression of his own ideals and plans, and is at the same time acquiring skill and defining, not merely trueness, but all the most essential elements of executive character.

All children who are not defective possess the three great fundamental elements of vital character as soon as they are able to reveal themselves to us. They have the tendency to do things, to do things they plan themselves, and to do things in cooperation with others. These are the essential elements in true Christian character; they are the elements that have enabled humanity to take progressive steps to higher civilization. True manual training develops these essential elements of independent executive character more fully than any other single study or process of school life.

Doctor Haney has been most successful in working out a system of manual training in harmony with true psychological laws that continues in the child's life in school under systematic direction the same fundamental, constructive and productive processes that all children naturally use before they go to school, if they are supplied with materials appropriate to their stage of growth, for the purpose of developing: first, their constructive, productive, transforming, achieving, industrial, individual and social powers; second, their highest skill; and third, their executive cooperative character. He was the first to carry out successfully what Froebel planned to do himself, by using material things in all schools to develop and define the child's own self-activity, and at the same time use material things so that they would lead each child to take a vital interest in the ordinary subjects taught in the schools by coordinating manual training with the other subjects of the course of study. My visitor was in the second stage of educational vision. He saw manual training as a disciplinary instead of a developing agency, and he failed to appreciate the New York work simply because he did not understand its highest purposes.

All true educational development has resulted from a conscious reverence for the selfhood of the child. This reverence is reducing knowledge ideals, and examination ideals, to their relatively subordinate position when compared with achieving, transforming, constructive, productive, operative processes in qualifying humanity for higher stages of progressive civilization by developing in each generation the highest individual powers, the highest skill, and the highest types of executive character. It will continue to change educational ideals until "education" will have a new and higher and broader meaning, with new standards, and new processes, and new tests: standards, processes and tests that will recognize every department of human power, physical, intellectual, and spiritual, every child's individual skill, and every element of executive and achieving moral character.

Doctor Haney has been a leader, not only in America but in the world, in revealing the greatest fact in regard to manual training; that its educational value, and not its economic value, is of vital importance. Its economic and disciplinary values are very important, but its universal value as a means of complete development is its supreme value. The director of New York's scheme has had a clear vision of this fundamental truth, and he has effectively wrought it into a practical system adapted to the child's interests and the child's powers, so that his interests are developed and widened, his originality made conscious and dominant, his skill cultivated, and his three essential moral tendencies—to do, to do what he himself plans, and to do in cooperation with his fellows—are trained into productive, executive character.

Doctor Haney was one of the first to elevate manual training to the plane of original expression instead of mere imitation. Formerly the twenty models produced by twenty boys were so absolutely alike in both construction and decoration that each boy had to look for his name on the back of the models before he could decide which one he had made. The constructive and decorative plans were drawn on the blackboard to scale, and these were copied by the pupils, first on paper and then on the wood or other material to be used in making the model. Now the fundamental laws of construction and of decoration are carefully explained, but, in making his model each boy has perfect "liberty under law." He is expected to produce a genuinely original model, but he must produce it in harmony with the laws of construction, of proportion, and of decoration, that have been explained to him. In this way his selfhood is developed and made conscious, and he learns at the same time one of the highest possible moral lessons—reverence for law as a guiding and not merely a restraining force in his life.

Doctor Haney coördinated manual training with art in a way that leaves little to be done in this department by his successors. Children under his training are made conscious of the importance of color harmony, of true proportion in decoration, of appropriateness of elements of design to different spaces, and to different materials, of the law of symmetry and of all the laws of artistic taste, so that they not only apply them independently in their own work, but weave them into their taste and judgment as permanent elements of intellectual and moral power. He not only coordinated art and manual training, he related them to the other school work in the most satisfactory way. He used them as agencies for developing the imagination in all classes from the lowest in which the little ones make illustrations of fairy tales, folk stories, or the experiences and occupations of primitive nations, to the highest, in which the constructive imagination is used to design and produce articles representing original combinations of constructive and decorative principles. He related them to mathematics, mechanics, composition, geography, and history, and thus intensified the interest of children in other school studies as well as in manual training and art.

One of the most suggestive and stimulating phases of the New York work is the comprehensive plan adopted for securing the cooperation of the teachers, regular and special, in improving the work of manual training and art in the schools, by reporting to the director all their best developments and ideals and discoveries in the application of laws, in simplifying processes, in overcoming difficulties, in adapting new elements of design, in using new forms of material so that all might get the advantage of the development of each of their co-workers. Pupils as well as teachers are included in this cooperative plan.

From the first the director saw that manual training should be a process of development and not merely of discipline, and he recognized very early that the development should not be confined to the individual. He was not long satisfied with developing the powers of doing, and of doing what each child planned and executed individually. He saw the necessity for training each individual to use his highest moral tendency by cooperating with his fellows, so he inaugurates a system of group work that in a most definite way fixes the apperceptive centers of the truest socialism, of universal unity, of brotherhood and community in the lives of the children, so that at maturity these moral principles shall not be mere theories but dominant elements in practical life.

This article does not pretend to do more than to give a general outline of some of the great fundamental and vital principles which formed the basis of the combined system of manual training and art which developed in the schools of New York City, and which have been and are still making school work everywhere where they are understood more productive in the development of power and skill and character. The writer wishes that he could more adequately express his personal indebtedness to Doctor Haney for his great contribution to new and better education.

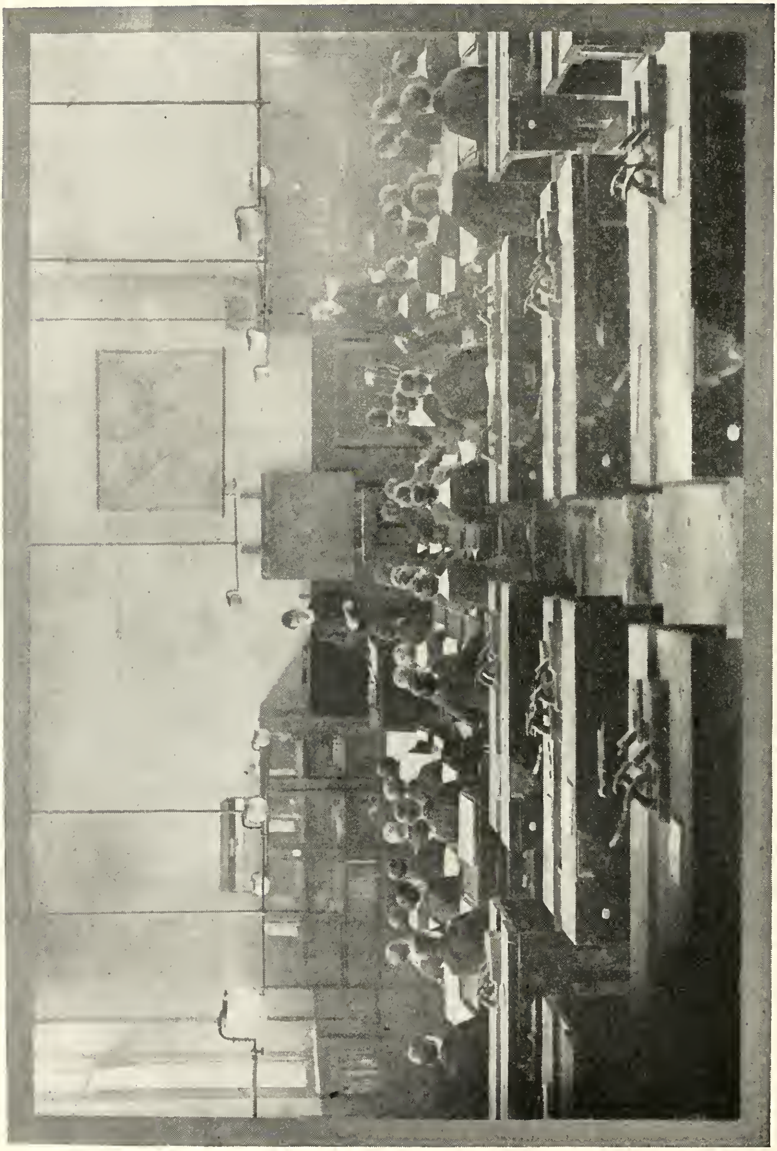


FIG. 63. WOODWORKING ROOM, SPRINGBANK SCHOOL, GLASGOW.

VISITING MANUAL TRAINING SCHOOLS IN EUROPE.

V.—GLASGOW AND EDINBURGH.

CHARLES A. BENNETT.

TO one who has traveled up and across the Mississippi Valley the ride from Leeds to Glasgow is but a short one. To go "up into Scotland" from the Midlands is hardly more than a trip from St. Louis to Peoria. But the scenery along the route is quite another matter. However, I lost the best of that because the darkness shut us in and I had to content myself with glimpses of the people and the stations in the towns where the train stopped.

After the first night's sleep in the country of Scott and Burns I set out to renew my acquaintaince with Mr. J. Vaughn, director of art and manual training in Glasgow, whom I had met sixteen years before at the Columbian Exposition in Chicago. Ever since I began to plan my European trip, I had looked forward to this opportunity, because I was interested in the "Practical Teacher's Art Monthly" (now *The Practical Teacher*) of which Mr. Vaughn is the editor, also in Nelson's New Drawing Course, of which Mr. Vaughn is the author. Then, too, the fact that Mr. Vaughn has approached the manual training from the art point of view, having been the art director in London for several years before he became director of both the art and manual training in Glasgow, caused me to be especially desirous of meeting him again and studying his work.

Glasgow has twenty-four woodworking centers, twenty of these being forty-pupil centers, three twenty-pupil centers, and one a sixty-pupil center. Forty instructors are employed. These centers are all for boys in the elementary schools, as there is but very little manual training in the secondary schools, the chief aim of these schools being to enable the boys to pass the university examinations. However, in the secondary schools freehand drawing is included in the course of instruction and is taught by special art masters.

Tht compulsory school age is from five to fourteen. The brighter boys who intend to leave school at the end of the compulsory period are separated from the others at the age of twelve years, and are put into what is called the supplementary class. To members of this class the instruction is made as practicable as possible with a view to probable future needs. Pupils are admitted to the supplementary class by examination. Some who cannot pass this at twelve years of age pass at thirteen. In the supplementary classes the pupils get three and one-half hours a week in manual training. In the other classes where manual training is taught it occupies one and one-half hours a week. Glasgow was the only British city I found where so short a time as one and one-half hours a week was tolerated for woodworking. The teachers give instruction to three classes each day instead of two as in the cities mentioned in previous articles. The hours of their classes are as follows: ten to half-past eleven; half-past eleven to one, and two to four.

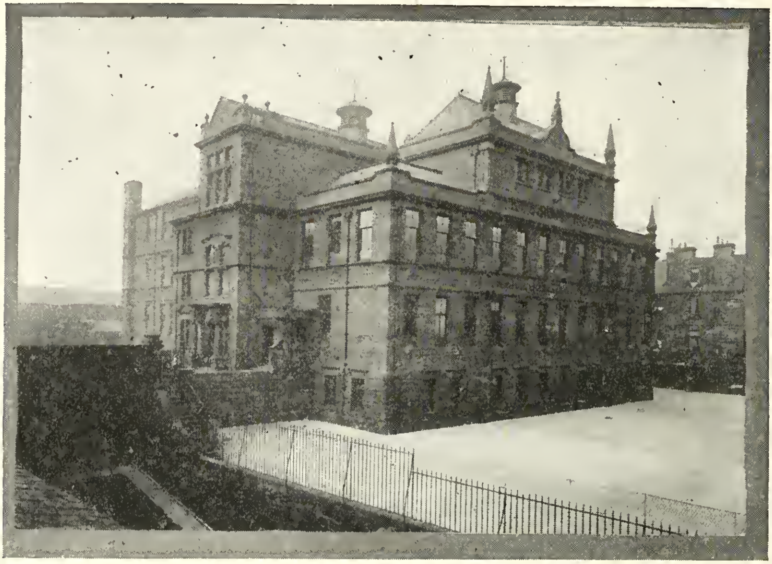


FIG. 64. THE PROVANSIDE SCHOOL, GLASGOW.

The school buildings I visited in Glasgow possessed a dignity and durable appearance which pleased me much. Perhaps this was partly due to the fact that they were built of stone. The Provanside School, Fig. 64, for the picture of which I am indebted to Mr. Vaughn, is a good example. I studied the manual training equipment at the Springbank School, which may be taken as typical. The woodworking room is shown in Fig. 63. In an unusual degree the Glasgow equipments embody the ideal of classroom and shop combined, because in addition to the workbenches they provide an ordinary classroom desk and seat for every boy in the class. I was much interested to learn that these are

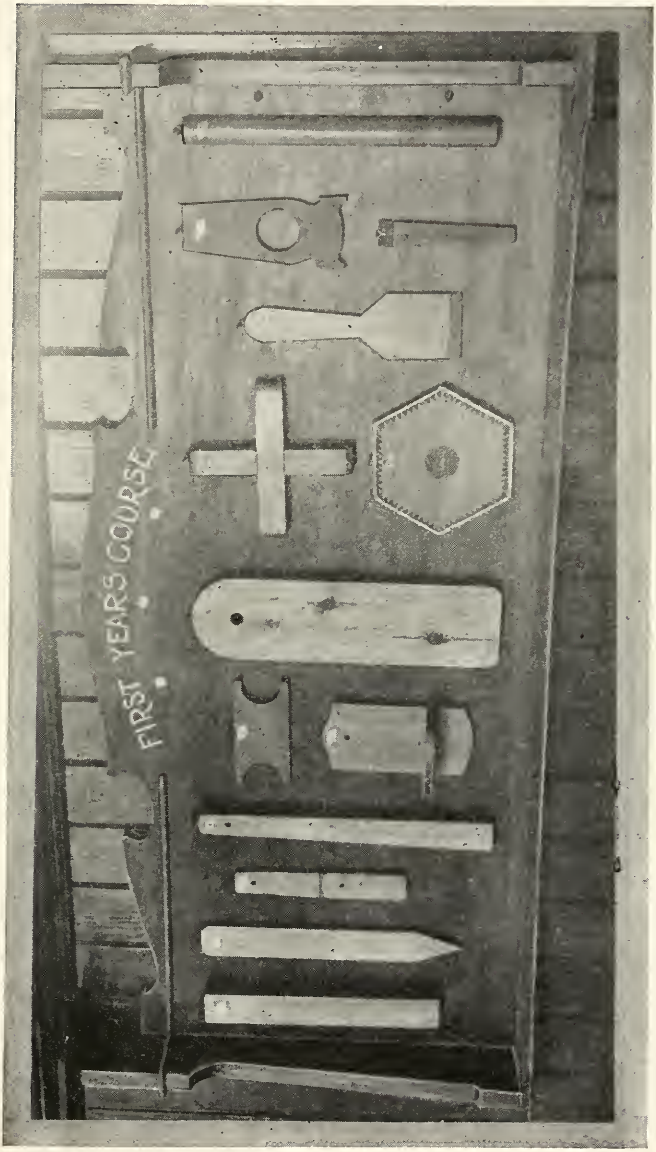

FIRST YEARS COURSE

FIG. 65. COURSE IN WOODWORKING, FIRST YEAR, SPRINGBANK SCHOOL, GLASGOW.

looked upon as a necessity. I have since wondered if the use of these school desks grew out of the fact that when manual training was first started at the John Street School in Glasgow eighteen years ago, an ordinary classroom was fitted up so that manual training classes could meet twice a week in the afternoon.[1] Whether this be so or not, rooms are made large enough for both desks and benches, and the drawing lessons are given while the pupils are seated at the desks, as shown in Fig. 63. Dual benches of rather heavy construction are used. The vises are made of metal, and the tools are kept below the top of the bench. Extra tools are kept in a wall cabinet. As in England, the room is usually well provided with illustrative material for use in teaching.

Another reason for using desks instead of arm chairs, such as we find in many school shops in Amercia, is found in the character of the drawing taught in the manual training classes. Not only the customary working drawings but also wash drawings of tools, models, geometric solids and sections of timber are made by the boys. In this work the shading is done with a pencil before the tint is put on.

One hour is given to drawing every alternate lesson. Drawings of models are made as fast as needed to precede the construction work in wood. The method of teaching the drawing changes as the pupils gain experience. In the first stage a class study is made of the model, the teacher making a drawing of it on the blackboard. After four or five drawings have been made in this way, each pupil works independent of the others in the class, taking his data from a small dimensioned sketch given him by the teacher. From this he makes a full-size orthographic projection drawing. In the last stage the pupil is given a model, and directly from this he makes the required drawing. Nowhere in the course are the pupils required to put dimensions on finished drawings. It will be seen that in the second stage, especially, the pupil learns to read drawings.

I had not visited many manual training centers in Glasgow before I discovered an atmosphere that was quite different from what I found in the larger English cities. There was a kind of freedom and thought-stimulating quality about it that reminded me of my native land. The cause was not far to seek. Mr. Vaughn does not believe in a uniform style of models for his city. He prefers to get results in another way. Instead of requiring all teachers to give the same models, he prefers to

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[1] Manual Training in Glasgow, by William Hume Rodger, *The Practical Teacher,* October, 1908.

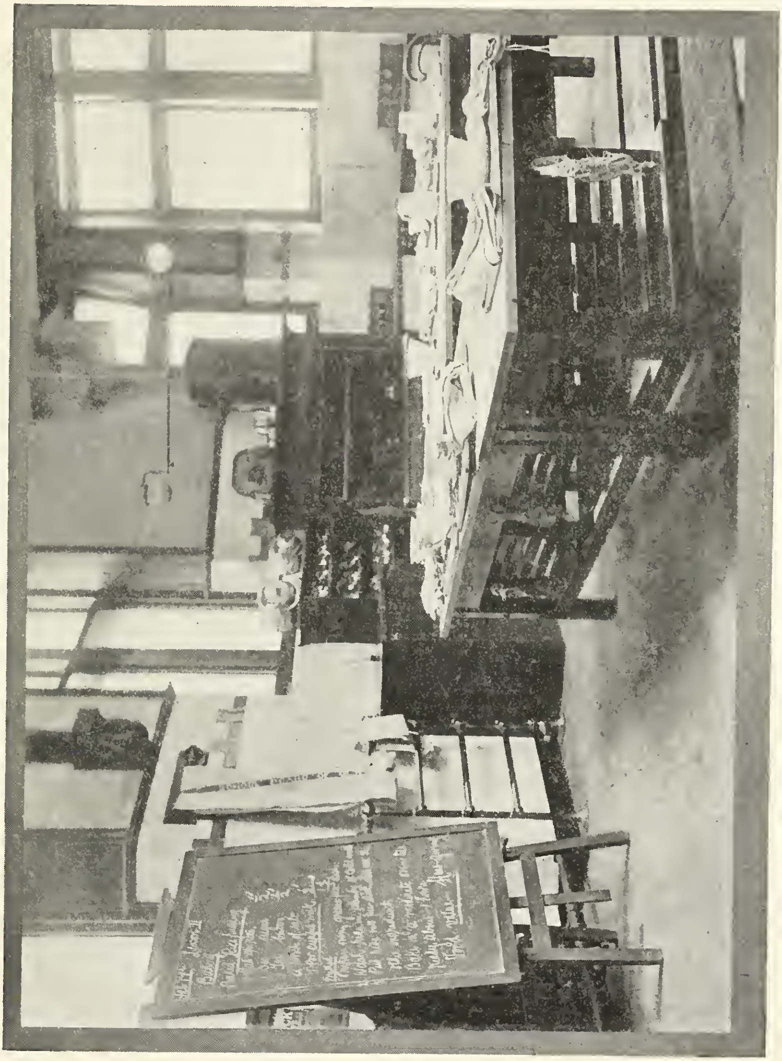


FIG. 66. CORNER OF COOKING ROOM, SPRINGBANK SCHOOL, GLASGOW.

encourage each teacher to study his own problems and then plan his own course. The teachers appear to feel and appreciate this privilege, and none of those I met seemed to be abusing it. Certain fundamental exercises, tho not in the same form, were found in every teacher's course and often a certain model would be used in several schools, yet I could see that each teacher felt unhampered in selecting the problems he gave to his classes.

But this freedom of choice did not stop with the teacher. In some of the schools the pupils were not only allowed to choose, within fixed limits, the models they would make, but were sometimes allowed to design them. In fact elementary constructive design was definitely taught in some of the centers. At the Springbank School I saw the manual training teacher, Charles Smith, giving a lesson in the designing of a model. I examined a large number of the pupils' drawings in order to discover the kinds of errors made. From what I observed and what was told me, I concluded that in Scotland, as in America, most of the unsatisfactory results in constructive design with twelve-year old boys come from expecting too much of them. Paucity of ideas, lack of form concepts and ignorance of the principles of construction are the great difficulties, and too few teachers make an effort to supply these deficiencies before they expect results. They try to draw wine from empty casks. But I was pleased to find that in Glasgow several models and drawings were made before a design problem was attempted and then only two such problems a year were usually given. Thus the pupil becomes well acquainted with the material of which the object is to be made and somewhat experienced in drawing appropriate forms before attempting to design. Moreover, the first problems are presented to the pupils with some of the outlines and dimensions given, so that the difficulties are reduced to their lowest terms in the beginning.

But the crucial point in getting satisfactory work in design is the teacher. If he has not developed his sense of form and proportion and fitness—if he cannot make good original designs himself, he is not competent to teach design to boys. And to acquire this sense is usually a slow process, covering years of training and experience. Mr. Vaughn recognizes this and encourages his teachers to study art on Saturdays. A surprisingly large proportion of the teachers in Glasgow—the regular classroom teachers as well as the special teachers of manual training—are members of the Saturday morning art classes. These meet in school buildings centrally located, in the high school, and in the School of Art. It was a pleasant surprise to find two of the manual training teachers

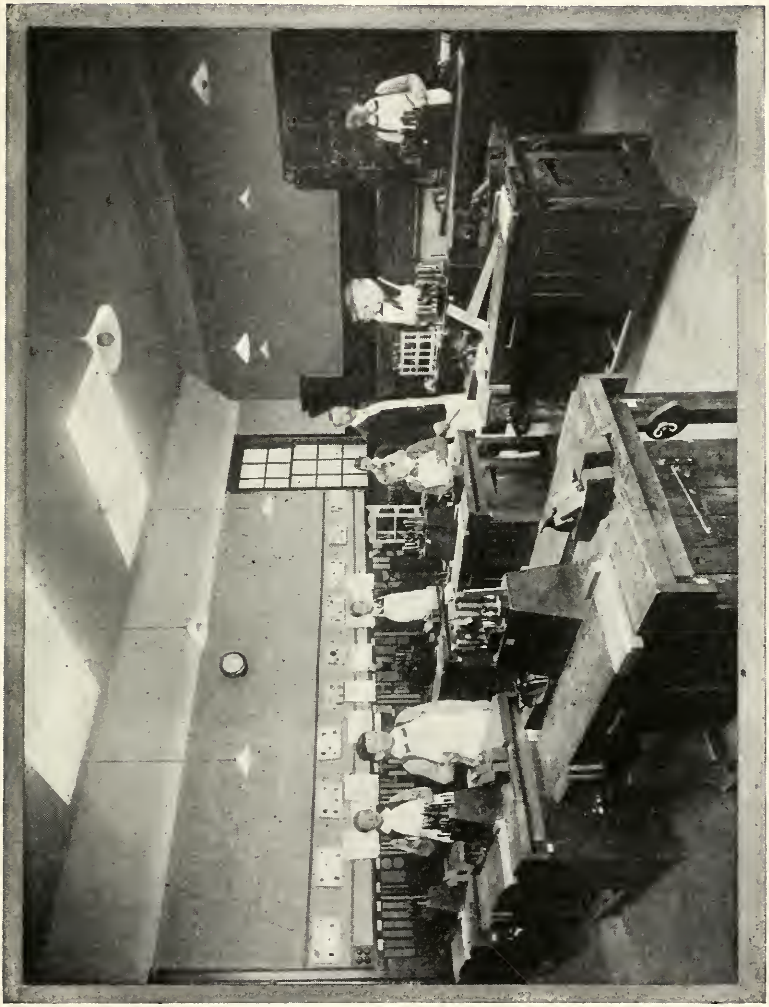


FIG. 67. WORKSHOP AS USED FOR WOODWORKING, FLORA STEVENSON SCHOOL, EDINBURGH.

I had met on Friday painting portraits at the Art School on Saturday morning, and again to meet quite a large group of such teachers at the art exhibition a little later in the day. Still others were busy in classes in metalwork and jewelry. I asked whether these teachers had been given courses in applied design. Mr. Vaughn said that they had not, but I understood him to say that he was looking forward to such courses in the future. These would bridge the gap between the art and the handwork in the preparation of teachers. Such a gap is noticeable in the manual arts instruction in most English cities. The "art drawing" in the schools usually has little or no connection with the shopwork. Tho a satisfactory relationship between art and manual training has not yet been fully developed in Glasgow, its value is appreciated by the supervisor, and forces are now at work which point encouragingly to the future.

Figure 65 shows the models for the first year at the Springbank school. In this same school is an excellent equipment for cooking, a corner of which is shown in Fig. 66. An equally good laundry equipment is provided; also a completely furnished living room and bedroom where pupils are taught lessons in cleaning and other processes of housekeeping.

I spent an evening at the Glasgow and West of Scotland Technical College, a school with a noble history and an excellent modern building. It was in one of the four institutions which were amalgamated to form this College that Dr. Birbeck started the classes in physical science for mechanics, which led to the founding of the first mechanics' institute in 1823—the starting point of a popular educational movement, the beneficent effect of which was felt and is still felt in America. Like the Municipal School of Technology in Manchester, this school is a great college of engineering and applied science.

My last few hours in Glasgow were spent at Langside—almost on the spot of the historic battle—where Mr. Vaughn has an attractive home overlooking the broad meadow and the castled hills beyond.

The next morning I was on my way from Edinburgh to Dunfermline with a letter of introduction to Provost Macbeth. The day was bright, and the varied scenery along the route made the ride a most enjoyable one. We crossed the Firth of Forth by the famous high bridge. As we passed onto the bridge I looked back and saw a picture I shall never forget. Almost beneath us at the left was a little village of squatty stone houses with red tile roofs, quiet in the morning sunshine. Pillars of delicate rising smoke connected the houses with a mass of light cloud

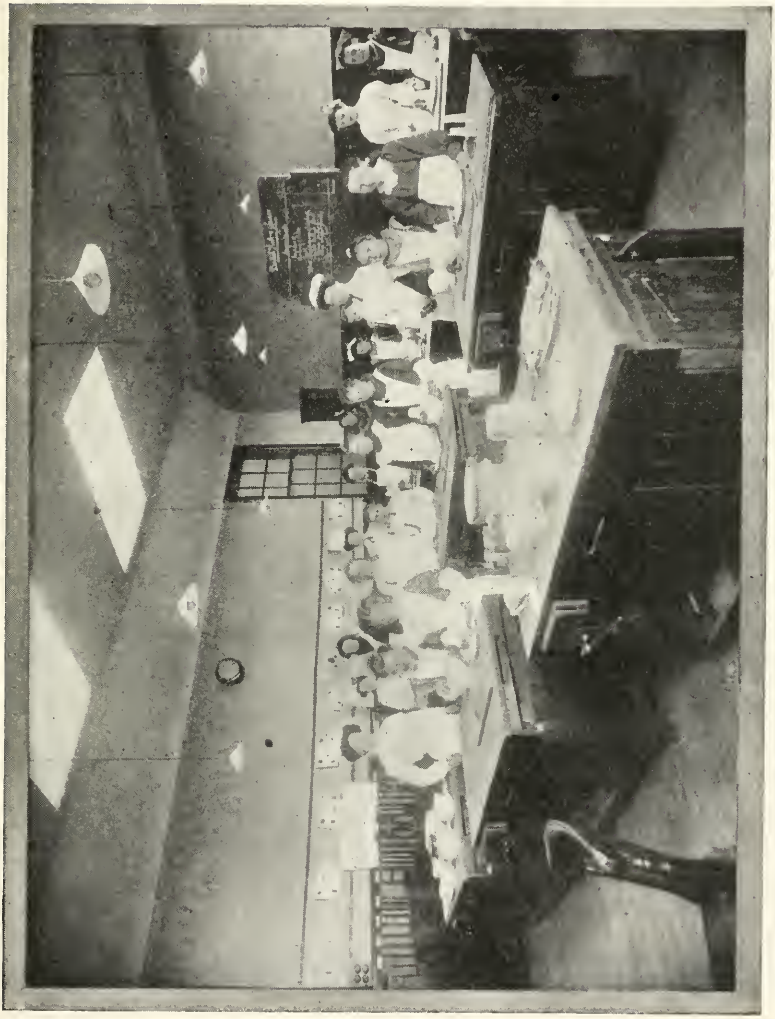


FIG. 68. WORKSHOP AS USED FOR COOKING, FLORA STEVENSON SCHOOL, EDINBURGH.

that hung over the village. To the right the broad Forth extended out into the middle distance, and the winter hills made up the background. I looked upon this scene with wonder and delight until nearly across the bridge, and on this account I caught only a passing glimpse of the view far to the east where sky and water meet.

A few minutes past the bridge and I was in Dunfermline and as an American citizen, the recipient of the most perfect hospitality. In the short space of about two hours, thru the kindness of the Provost and the secretary of the Carnegie Trust, I was given an opportunity to see the College of Hygiene and Physical Training with its most excellent gymnasium and swimming pool, the Townhill Library, the School of Artistic Crafts, and the Pittencrieff Park and Glen, all of which have been provided by Andrew Carnegie for the people of his native place thru the Carnegie Dunfermline Trust. I was taken, also, to the Technical School where I saw classes at work in the woodworking shop. Of course I saw the Abbey and the birthplace of Mr. Carnegie, as every American visitor does and should. After luncheon, I took the train back to Edinburgh feeling that I would like to return in the summer and spend a week studying the beauties of the Glen and the excellent institutions of the city.

My time in Edinburgh was too brief, but the helpfulness of David Graham, the supervisor of manual training, compensated in a large measure for the shortness of my stay. "Manual instruction" is taught in thirty-seven elementary schools in Edinburgh by a staff of seventeen instructors, and with two exceptions, each of these schools has its own workshop equipment. During the year 1907-8 the number of pupils receiving instruction in woodwork was 5048. The course covers three years. The time given to woodwork and mechanical drawing is two hours a week, except in supplementary classes where it is three and one-half hours—one lesson of two hours and one of one and one-half. As a rule teachers give instruction to three classes a day, the maximum number of hours per week being twenty-five.

Since there are thirty-seven shops and seventeen teachers, it will be seen that the teachers go from school to school. In order, therefore, to utilize more fully the large amount of space taken for woodwork in these schools the shops are used a part of the time for cooking, and some of them for laundry work also. This feature of the Edinburgh system was new to me, tho I have since learned that one city in the United States, Seattle, is using substantially the same system. Figure

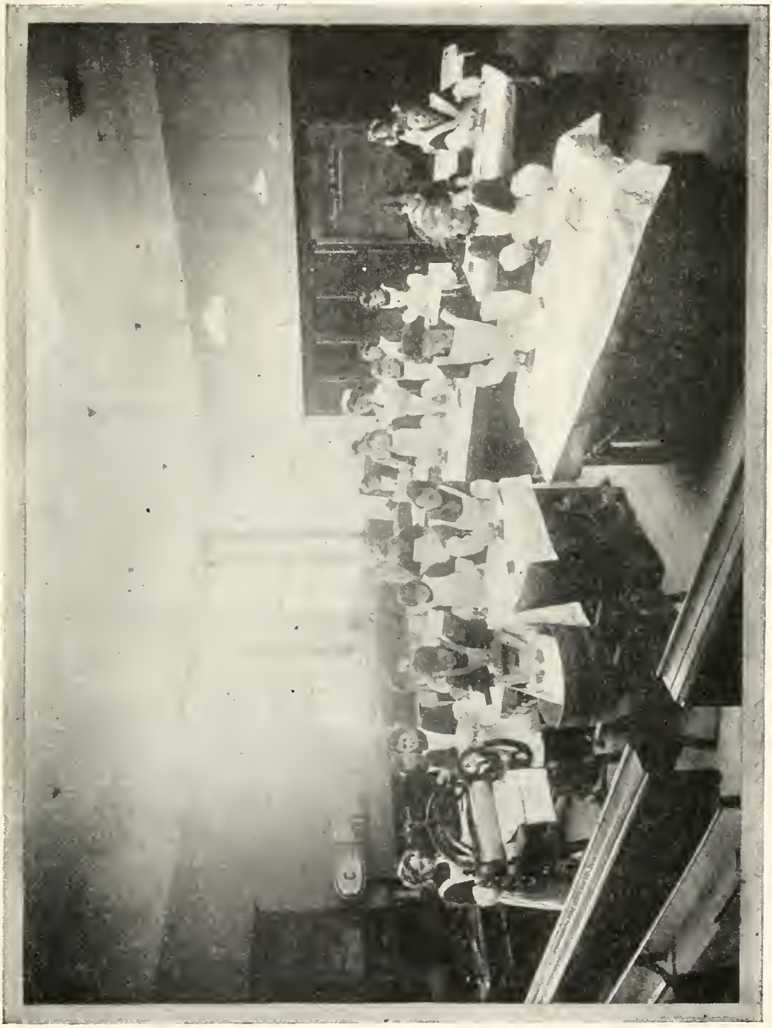
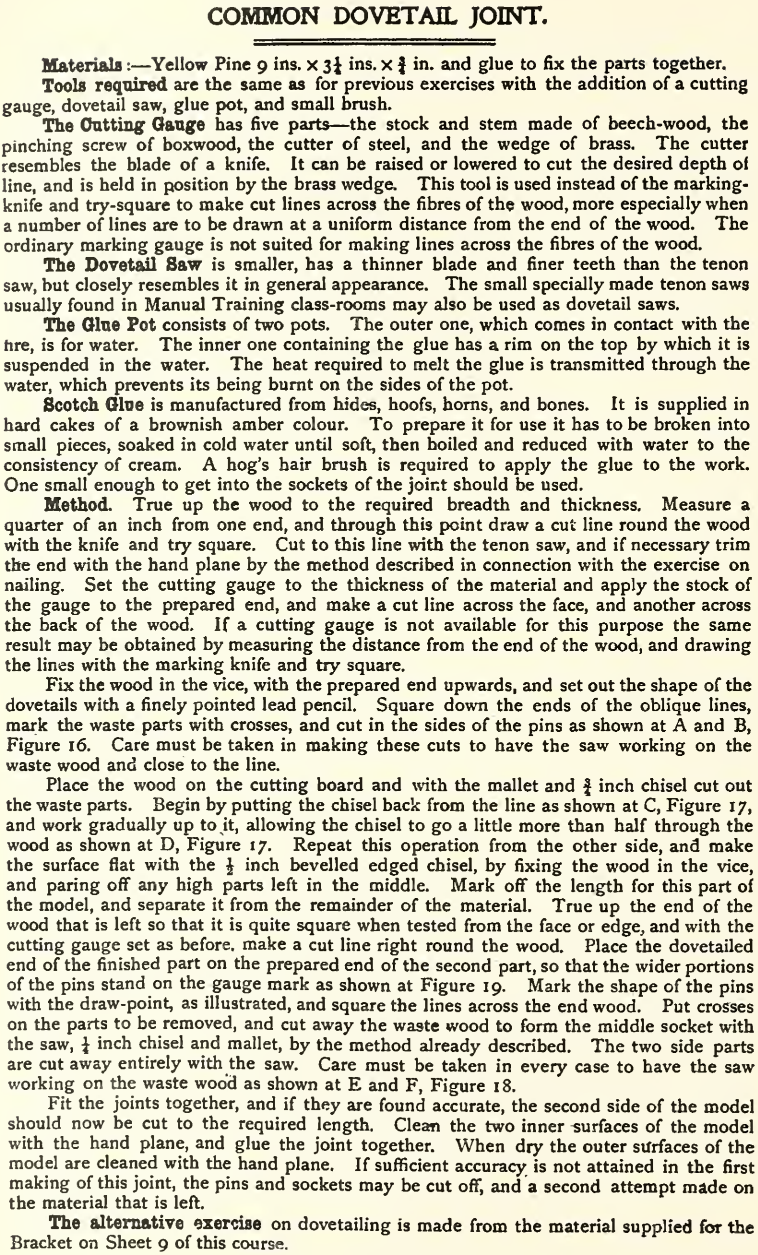


FIG. 69. WORKSHOP AS USED FOR LAUNDRY WORK, FLORA STEVENSON SCHOOL, EDINBURGH.



COMMON DOVETAIL JOINT.

Materials:—Yellow Pine 9 ins. × 3¼ ins. × ¾ in. and glue to fix the parts together.

Tools required are the same as for previous exercises with the addition of a cutting gauge, dovetail saw, glue pot, and small brush.

The Cutting Gauge has five parts—the stock and stem made of beech-wood, the pinching screw of boxwood, the cutter of steel, and the wedge of brass. The cutter resembles the blade of a knife. It can be raised or lowered to cut the desired depth of line, and is held in position by the brass wedge. This tool is used instead of the marking-knife and try-square to make cut lines across the fibres of the wood, more especially when a number of lines are to be drawn at a uniform distance from the end of the wood. The ordinary marking gauge is not suited for making lines across the fibres of the wood.

The Dovetail Saw is smaller, has a thinner blade and finer teeth than the tenon saw, but closely resembles it in general appearance. The small specially made tenon saws usually found in Manual Training class-rooms may also be used as dovetail saws.

The Glue Pot consists of two pots. The outer one, which comes in contact with the fire, is for water. The inner one containing the glue has a rim on the top by which it is suspended in the water. The heat required to melt the glue is transmitted through the water, which prevents its being burnt on the sides of the pot.

Scotch Glue is manufactured from hides, hoofs, horns, and bones. It is supplied in hard cakes of a brownish amber colour. To prepare it for use it has to be broken into small pieces, soaked in cold water until soft, then boiled and reduced with water to the consistency of cream. A hog's hair brush is required to apply the glue to the work. One small enough to get into the sockets of the joint should be used.

Method. True up the wood to the required breadth and thickness. Measure a quarter of an inch from one end, and through this point draw a cut line round the wood with the knife and try square. Cut to this line with the tenon saw, and if necessary trim the end with the hand plane by the method described in connection with the exercise on nailing. Set the cutting gauge to the thickness of the material and apply the stock of the gauge to the prepared end, and make a cut line across the face, and another across the back of the wood. If a cutting gauge is not available for this purpose the same result may be obtained by measuring the distance from the end of the wood, and drawing the lines with the marking knife and try square.

Fix the wood in the vice, with the prepared end upwards, and set out the shape of the dovetails with a finely pointed lead pencil. Square down the ends of the oblique lines, mark the waste parts with crosses, and cut in the sides of the pins as shown at A and B, Figure 16. Care must be taken in making these cuts to have the saw working on the waste wood and close to the line.

Place the wood on the cutting board and with the mallet and ¾ inch chisel cut out the waste parts. Begin by putting the chisel back from the line as shown at C, Figure 17, and work gradually up to it, allowing the chisel to go a little more than half through the wood as shown at D, Figure 17. Repeat this operation from the other side, and make the surface flat with the ½ inch bevelled edged chisel, by fixing the wood in the vice, and paring off any high parts left in the middle. Mark off the length for this part of the model, and separate it from the remainder of the material. True up the end of the wood that is left so that it is quite square when tested from the face or edge, and with the cutting gauge set as before, make a cut line right round the wood. Place the dovetailed end of the finished part on the prepared end of the second part, so that the wider portions of the pins stand on the gauge mark as shown at Figure 19. Mark the shape of the pins with the draw-point, as illustrated, and square the lines across the end wood. Put crosses on the parts to be removed, and cut away the waste wood to form the middle socket with the saw, ¼ inch chisel and mallet, by the method already described. The two side parts are cut away entirely with the saw. Care must be taken in every case to have the saw working on the waste wood as shown at E and F, Figure 18.

Fit the joints together, and if they are found accurate, the second side of the model should now be cut to the required length. Clean the two inner surfaces of the model with the hand plane, and glue the joint together. When dry the outer surfaces of the model are cleaned with the hand plane. If sufficient accuracy is not attained in the first making of this joint, the pins and sockets may be cut off, and a second attempt made on the material that is left.

The alternative exercise on dovetailing is made from the material supplied for the Bracket on Sheet 9 of this course.

FIG. 71. LEFT-HAND HALF OF PAGE IN "WOODWORK MANUAL INSTRUCTION," BY GRAHAM.

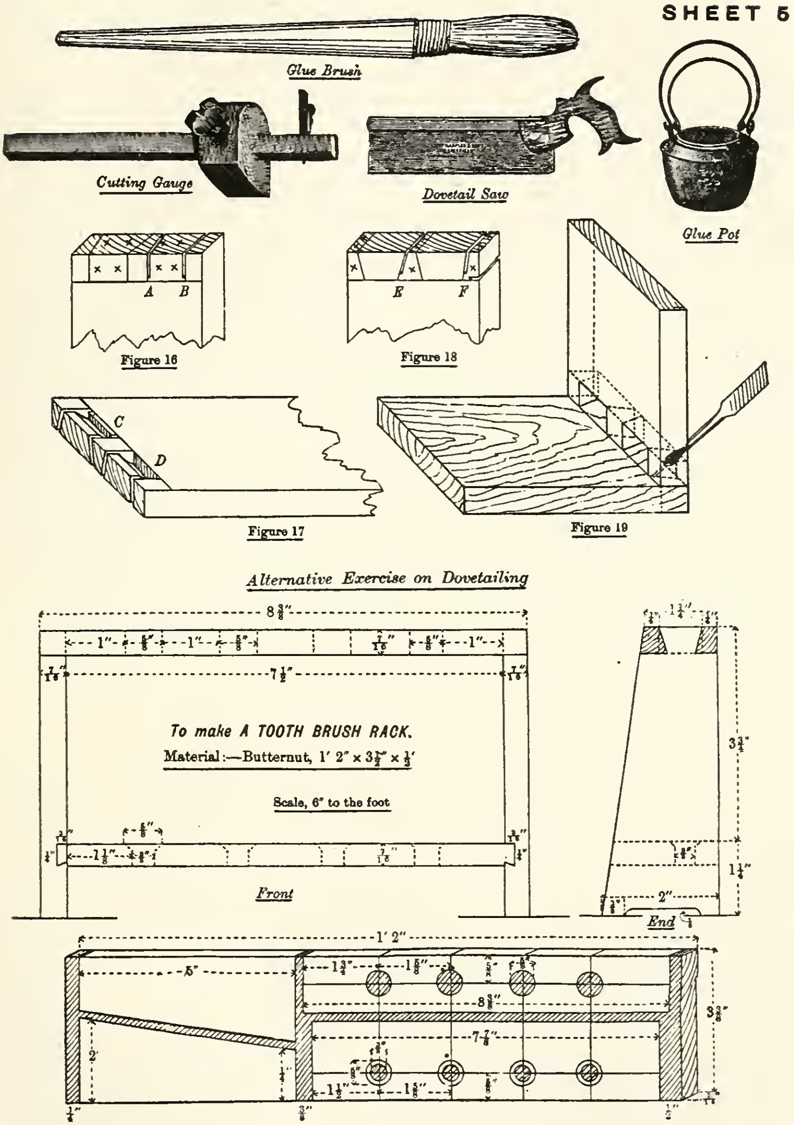

SHEET 5
Glue Brush
Cutting Gauge
Dovetail Saw
Glue Pot
A
B
Figure 16
E
F
Figure 18
C
D
Figure 17
Figure 19
Alternative Exercise on Dovetailing
8⅜″
1″
⅝″
7/16″
7½″
To make A TOOTH BRUSH RACK.
Material:—Butternut, 1′ 2″ × 3½″ × ½′
Scale, 6″ to the foot
1⅛″
Front
1¼″
3¾″
1¼″
2″
End
1′ 2″
5″
1¾″
1⅝″
8⅜″
7⅞″
3⅜″
2′
1½″
1⅝″

FIG. 72. RIGHT-HAND HALF OF PAGE IN "WOODWORK MANUAL INSTRUCTION," BY GRAHAM.

70 shows the Flora Stevenson School, a thoroly modern building, opened in September, 1907. Figure 67 gives a view of the workshop in this school. It contains nine dual benches, seats for pupils, blackboard, cabinets for tools and unfinished work, and everything necessary to make a good equipment. Figure 68 shows the same room but with a class of girls receiving instruction in cooking. The tools and the tool-racks have been placed in the cupboards beneath the benches and table tops have been placed on top of the benches. Figure 69 shows the same room from another point of view with a full equipment for laundry work. This picture also reveals one of the two gas ranges which during woodworking hours are protected with sheet iron covers. The sinks on one side of the room are used by all three of the classes. Twenty-six of the woodworking shops in Edinburgh are used for cooking and several of these have equipments for laundry work. Concerning this use of rooms for two or three kinds of work Mr. Graham says, "A separate room for each purpose gives less trouble to the teacher, but so far as one can judge from the success attending the pupils' efforts, there is no disadvantage in the system of dual occupation, and from a purely economic point of view it has many advantages."

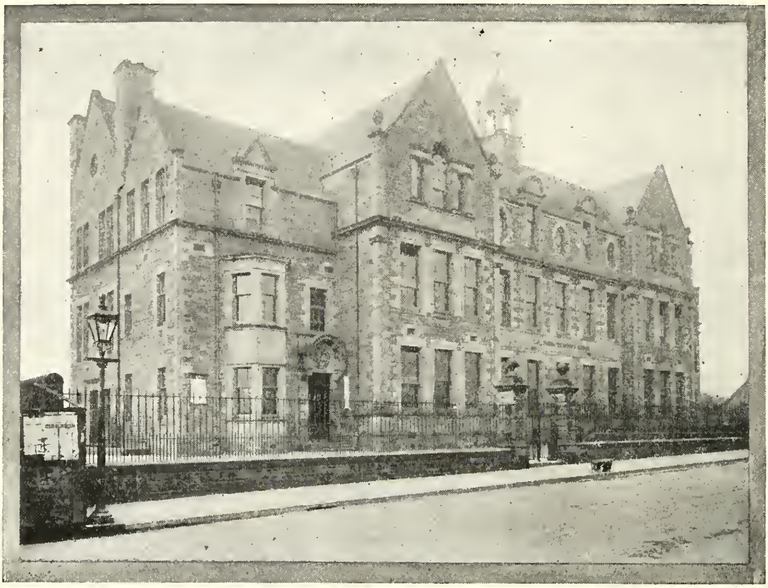


FIG. 70. THE FLORA STEVENSON SCHOOL, EDINBURGH.

Mr. Graham studied the Swedish sloyd under Herr Salomon, but he does not follow what are popularly known as "sloyd methods." He was trained as an architect and worker in wood before he studied sloyd, and admits that he may be biased somewhat on that account. Moreover, he finds that the knife used so much in the sloyd is almost an unknown tool in Scotland, and therefore not necessary to teach for practical purposes. He would not emphasize the need of useful models, but would like to have them such, as a rule. But when a problem involves a complex joint, he finds the boys like to make a preliminary practice piece. To the proposition that the result wanted is the intelligent and skillful boy and not the accurate and finished joint he agrees most heartily, but he believes that the work produced by the boy reveals the development that is taking place in the boy. To place emphasis on the formation of correct habits in the use of tools thru simple exercises which focus the attention on the tool process rather than on the usefulness of the model seems to be Mr. Graham's primary aim.

A prescribed course of models is used in Edinburgh. The drawings of these models accompanied by directions for working, notes, and explanatory diagrams are published under the title "Woodwork Manual Instruction," in three parts (one for each year) by McDougall's Educational Company, Edinburgh. On each left-hand page in the first two parts a model is shown in orthographic projection—sometimes also in isometric. On each right-hand page are (a) perspective views of the new tools involved in the model, (b) drawings intended to help the pupil in laying out the model on the given stock, Fig. 72, and (c) working directions, descriptions of tools, notes on materials, etc., Fig. 71. Mr. Graham says that since he has provided these books for his pupils his work has grown stronger. Each boy now has an added means of getting the needed information concerning the problem in hand. Not only does he get it thru the ear from what the teacher says, and thru the eye from what the teacher does, but also thru the eye from the diagrams and text in the book. When the pupil forgets something, he refers to the book instead of waiting to get the teacher's attention. I saw one teacher reading the text of the book with his class. I understand that this method is often pursued with the beginners.

I made inquiries concerning the training courses for teachers of manual instruction, and found that the shopwork part of their training consists of only one and one-half hours a week for three years.

From Edinburgh I returned to London by the "cathedral route," stopping off at Durham, York, Lincoln and Ely.

(*To be continued.*)

THE PRESENT STATUS OF MANUAL TRAINING IN ITS RELATION TO INDUSTRIAL EDUCATION IN RURAL SCHOOLS.[1]

B. M. DAVIS.

ACCORDING to a recent report[2] by Henry Turner Bailey on instruction in the fine and manual arts in the United States, such instruction is required in the elementary schools in 933 cities, and is also required in 258 public high schools. Some of the high schools mentioned in this report are union and township high schools in rural communities. Doubtless many others giving similar work might be added to the list.

While making a study of the work in agricultural education in our elementary and secondary schools it was noticed that manual training is often, if not usually, associated with agricultural instruction. Further investigation suggested that altho the present status of manual training in the rural schools could not be reduced to a statistical summary, it might be approximately determined indirectly, so as to obtain a fairly clear notion of the drift of educational sentiment in regard to it.

State departments of education in various states, while differing in the minor details of their organization, are alike in their position as heads of the educational systems of their respective states. The attitude of the administrative head of a state department of education has an important bearing on the educational policy of that state. On the other hand, since he is a state officer by the will of the people he represents in a certain sense their wishes, and, altho a leader in educational matters, he does not go far beyond public sentiment. If he finds the public ready for what he regards as an important step toward the improvement of public schools, he recommends legislative action either directly or indirectly thru an educational commission or similar agency. The state office is also chiefly responsible for the state course of study, state manual for teachers, adoption of state textbooks, and other matters directly affecting the schools.

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[1] Read at Annual Meeting of the Ohio Art and Manual Training Teachers' Association held at Toledo, Ohio, November 12, 1909.

[2] Henry Turner Bailey: Instruction in the Fine and Manual Arts in the United States; U. S. Bureau of Education, Bulletin (1909), No. 6.

In view of these considerations regarding the influence and importance of the state departments of education, I have undertaken to present my subject as reflected from these offices of the various states.

In general, the subject of industrial education is now receiving more attention than any other phase of education. In the latest reports from the forty-eight states and territories, there was not one that did not have some reference to this subject. In many reports it was discussed in much detail. A few quotations may be of interest:

EXTRACTS FROM REPORTS OF STATE SUPERINTENDENTS.

Colorado.—Work should be made to apply to local conditions, such as introduction of elementary agriculture, the science of irrigation, manual training and domestic science. The rural schools have a broader field for the introduction of these branches than city schools, therefore they should not be neglected in the slightest degree.

Indiana.—The period of nine or ten to thirteen or fourteen years in the child's life is the crisis. Here is met the demand for adjustment of professional and vocational tendencies. . . Two lines of work must be carried on. These may be called here the academic and the expressive or industrial phases. The academic would include what may still be regarded as fundamentals in education: reading, language, mathematics, science and history. The expressive or industrial phase would include music, drawing, woodwork for boys and sewing and cooking for girls. . . With intensive, interesting concrete work based upon home life and industry running thru the grades, and the elimination of all dead mechanical work based upon tradition, there would still be time enough for much real manual training, benchwork for the boys—work much closer to the trades than manual training in the high school—and sewing and cooking for the girls.

Iowa.—While manual training is firmly established in but few of the Iowa schools, the outlook is encouraging. The need of such training is widely recognized; but two principal difficulties have stood in the way of its rapid extension: *First,* There has been a dearth of thoroly equipped manual training and domestic science teachers; and *second,* the popular impression has been that the expense incident to this kind of instruction is very great. The first named difficulty will be soon overcome . . ; the second objection is far less formidable than many suppose. (Here tables are introduced showing the low cost of manual training equipment.)

Idaho.—Manual training and domestic science are of vital importance and should be under special supervision in every district.

Massachusetts.—Manual training is not industrial education but an element of it. . . So far as it goes it is industrial training. If there were added to it in the school shops, instruction in the calculation of cost of material and labor of the articles made it would be industrial education. The Elliot School of Jamaica Plain is cited as a good example of what should be expected. Here articles of commercial value are made and principles of division of labor applied.

Michigan.—In order to advance the cause of industrial education the legislature should authorize an appropriation for state aid to be given in limited amounts to schools that introduce courses in elementary agriculture, manual training and domestic science.

Missouri.—In the curricula of our high schools, modern languages, commercial branches, manual training, domestic science and elementary agriculture are claiming places, in response to a demand for training that will fit the individual to cope successfuly with the forces and conditions around him. It is also recommended that state aid be given to high schools, that agriculture be part of the regular course, and that such other industrial subjects be included as will best meet the needs of the community.

North Carolina.—In North Carolina, state aid has been recently given to established high schools; 156 have been established in 81 counties. It is recommended as the next step that in connection with these public high schools or in separate schools industrial and agricultural training be provided for the masses of the children of a people, 82 per cent of whom are rural and agricultural.

These expressions of opinion represent a wide range of territory and have been chosen because they show that favorable attitude toward industrial education is not confined to any particular locality but extends in fact over the entire country. Similar quotations might have been made from many other state departments. It will be seen that manual training and agriculture are closely associated in the suggestions for improvement of the rural schools. But the efficiency of these subjects in the rural schools is closely connected with the general improvement of these schools. It is a well known fact that in almost every respect the rural schools are less efficient than the urban schools. Taking the country as a whole, much must be done to put the rural schools in a position where they may reap the benefit of such instruction as manual training and elementary agriculture. Legislation has already been tried and except as propaganda has failed. Eighteen states now require agriculture to be taught in the rural schools.[3] But agriculture is not being taught in even a majority of the schools of these states. Manual training and agricultural education are in the scheme for improving the rural schools. The present educational efforts are now mainly preliminary. The general introduction of these subjects will come later.

In Mississippi, for example, 75 per cent of the teachers have never attended any other than the rural schools. No one has yet had the temerity to figure out the percentage for Ohio. Ohio and Florida rank together in the encouragement offered for professional training of their teachers.

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[3] Davis: Agricultural Education; The Eelementary School Teacher; Vol. X, No. 4, pp. 170-175.

The training of teachers is just now the most important problem in connection with rural school improvement. Perhaps the most effective work now being done or at least the most effective means for reaching a considerable number of teachers, is thru country training schools. Wisconsin, Nebraska, Minnesota and Michigan have had these schools in operation for some time. In nearly all of these county training schools elementary agriculture and manual training receive considerable attention. Another movement that is advocated by every state without exception is consolidation of the rural schools. Ohio has been a pioneer in this work but it has extended to all the other states. Even Oregon, California, Montana and others of the large states are enthusiastic supporters of consolidation.

State aid to high schools is being given more and more. This aid is for the direct benefit of the schools of rural communities. This year Minnesota provided for state aid to the amount of $2,500 for each of ten high schools giving instruction in agriculture and other industrial subjects. In the act providing for the appropriation this paragraph occurs:

> For purpose of extending the teaching of agriculture, home economics and manual training in the rural schools, and for the purpose of extending the influence of state high schools, one or more rural schools may become associated with any state high school. . . The rural school or schools together with the central school, shall be known thereafter as the associated school of .... for teaching agriculture and manual training.

The last (1909) legislature of Virginia made similar provision for the encouragement of agriculture and manual training, appropriating $20,000. In Texas any amount not exceeding $500 spent by any district in establishing manual training in its high school is duplicated by the state. District agricultural high schools have been established in Alabama, Georgia and Oklahoma. County schools of agriculture have been established in Michigan, Minnesota, and Wisconsin. These are state schools for the direct benefit of rural communities. Manual training and domestic science and arts are included in the course of instruction.

Other lines of effort are being made to promote the improvement of rural schools. One of these deserves special mention. In Nebraska an attempt has been made to work out this problem: "Without funds, equipment, or sufficient state of community interest, what method of procedure will bring about the necessary interest in these lines of industrial education and what action will lead to measures which will provide sufficient funds for giving this work its proper place in the public schools."[4]

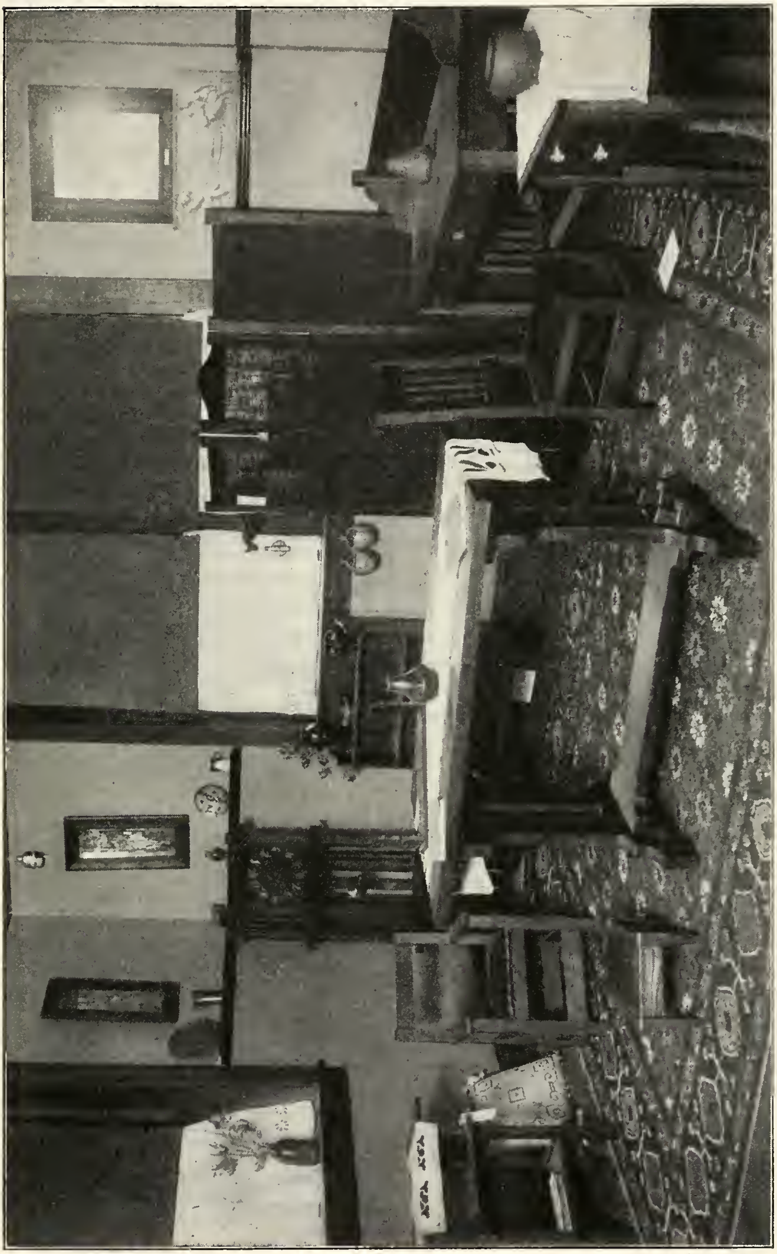
The method being used in the solution of the problem is in making "the best possible use of the one room rural school in our work of evolution toward the consolidated school, and the facilities at hand in this generation."

Industrial education is being considered also in a large way by special commissions on industrial education. Such commissions have been at work in Massachusetts and other states. One of the recommendations of the Ohio State Commissioner of Education for action at the next legislature is that provision be made for a commission on industrial education in Ohio.

As already indicated agricultural education and manual training are generally recognized as part of the movement toward the betterment of rural schools. Their actual introduction and effective service, however, depend upon other improvements that must be made first. Better training of teachers or facilities for their training, the consolidation of rural schools, state aid to high school in rural communities, establishment of county and district agricultural high schools, special efforts by means of boys' and girls' clubs with prizes offered for work in agriculture and manual training and domestic science and arts, state commissions for the study of industrial education, associations of teachers, and many other factors are now actively concerned in the improvement of the rural schools.

It is generally assumed that manual training is an important part of industrial education. But it must not be regarded as the whole thing. It must not justify itself by claiming any particular virtue as a mental discipline, but by closely adjusting and associating itself with other forms of industrial education that together they may count for the greatest educational efficiency in our schools. In so far as manual training has borne this relation to industrial education in rural schools it has grown in favor and usefulness. The problem immediately before those interested in manual training has already been suggested. It lies in active cooperation with the various movements for industrial education already well under way.

[4] E. C. Bishop: Agriculture, Domestic Art, and Manual Training without Funds or Equipment; Proceedings of National Educational Association, 1907, p. 1079.



PART OF THE SHOPWORK EXHIBIT, PUBLIC SCHOOLS OF LINCOLN, NEBRASKA, AT STATE TEACHERS' ASSOCIATION.

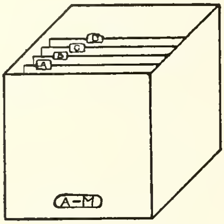


Fig. 1

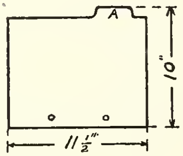


Fig. 2

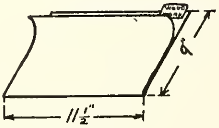


Fig. 3.

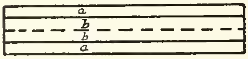


Fig. 4

A SIMPLE FILING SYSTEM.

James R. Forden.

ONE of the most valuable adjuncts to a teacher's library, outside of the books treating of his special subject, is that class of literature published in magazines, pamphlets, circulars, catalogs, school reports, courses of study, etc. Thus far the material on the manual arts in book form has not been so valuable to the teacher as that which is found in the reports, magazines, etc., dealing with present day problems in manual arts instruction. It is therefore highly necessary to preserve this isolated literature in some usable form so that one can get what he wants, when he wants it, and with the least possible waste of time and confusion if it is to become of any value.

The old style method of binding professional magazines is cumbersome and expensive and does not give any tabulated form of reference. The most satisfactory method of taking care of the current literature, to my knowledge, is a filing system based on the card index plan. There are many vertical filing cabinets now on the market that are exceedingly useful for the purpose. The units of such systems consist of a number of heavy box-board boxes of cubical form, see Fig. 1. These may be purchased singly or in any quantity. It is advisable to begin with one and keep adding thereto as increase of material demands.

Within this box are heavy manila partitions corresponding in number to the letters of the alphabet, see Fig. 2. These are fastened to the bottom on wires similar to the arrangement in a library card catalog case.

Between these partitions are inserted pockets made from sheets of light weight manila paper 11½x18 inches folded across the middle, see Fig. 3. Into these pockets are placed the data that is to be filed away. To properly tabulate the material, a small tab is glued to the upper edge of each pocket, on which may be written the necessary topic. These tabs may be secured at any book store, but if one wishes to make his own, use a strip of stiff manila tag board 1½x12 inches, see Fig. 4. Spread glue over one side, fold on middle line and carefully press parts b, b, together, but bending parts a, a, apart so these portions of the strip will not be stuck together. After the glue has dried, cut the strip into lengths as desired. By moistening the free edges each tab can be fastened to the edge of a pocket easily and quickly, see Fig. 3.

With such a system the pockets may be increased indefinitely by adding a corresponding subdivision in the index.

Instead of binding magazines into cumbersome books, take them apart and insert each article with its pages bound with a handy paper fastener into the pocket having an appropriate heading for it and similar articles. Circulars, price lists, newspaper clippings, quotations, etc., can be filed in the same manne.

To get the material wanted on any particular subject, a quick glance over the file will reveal the pocket, which can be withdrawn, and its contents examined without interfering with other parts of the file.

Such a system does not lend itself to the filing of books or those papers and books not in one's own library. To have these at one's instant service it is only necessary to keep a card index. Boxes 4x5½x12 inches can be had along with the vertical files. By jotting down titles and publishers of books or, if a magazine, the date of issue upon a card and inserting it under the proper heading in the card catalog there is always a vast amount of material readily accessible. By keeping a supply of cards in one's pocket ready for instant record at any and all times whenever useful data appears, much valuable material as well as time will be saved for use when most needed.

EDITORIAL

Dr. Wooward Retires

For a frontispiece in this issue we present a portrait of Dr. Calvin M. Woodward, "the father of manual training." It would be appropriate at any time for this Magazine to publish Dr. Woodward's portrait, but it is especially so now in view of the following letter which we quote from *Student Life* for March 9, 1910:

St. Louis, Mo., February 8, 1910.

Dr. David F. Houston,
Chancellor of Washington University.

Dear Sir: With great reluctance and after long deliberations, I have decided to lay down my active educational work on the first of July next. Accordingly, I hereby tender my resignation of the Nathaniel Thayer Professorship of Mathematics and Applied Mechanics, the deanship of the School of Engineering and Architecture, and the directorship of the Manual Training School, to take effect on the date named above.

While I am not conscious of any loss of interest in the University and its students, nor of enjoyment in actual teaching, I cannot overlook the fact that I shall have given to the University forty-five years of continuous service (with the exception of five weeks when I was off duty with a broken arm), and that, in the natural course of human events, my life work is drawing towards its close. Moreover, I desire during the next year or two absolute freedom to finish the preparation of a text book, which shall be my last and best gift to students in Applied Mechanics.

However, I hope I shall never lose touch with the University. The devotion of a long life has made it and all its interests dear to me; it shall always command my service if it seems to be needed.

The School of Engineering and Architecture is now so magnificently endowed and equipped that its permanent success is assured. It fairly realizes my dream of forty years ago, and my heart is full of gratitude as I recall the names of its benefactors, from that of President and Chancellor Eliot down to those who, thank God, are still with us.

While my chief interest has always been in the higher technical department, I have given no small amount of time and thought to the establishment and administration of the Manual Training School. I am glad to believe that it has done much for the cause of rational education, and that it has been a pillar of strength to the University. It has always been fortunate in its friends—may that good fortune never fail.

With sincere respect,

Calvin M. Woodward.

The expressions of esteem and appreciation that were showered upon Dr. Woodward when this letter was made public were most hearty. In accepting the resignation the Board of Directors of the University spoke at some length of the distinguished services he had rendered and adopted the following resolutions:

> 1. *Resolved,* By the Directors of Washington University, that we accept with great regret the resignation of the Nestor of our faculty, Professor Calvin Milton Woodward, whose inspiring force and unceasing work in behalf of our institution will be greatly missed.
>
> 2. *Resolved,* That, while the University sustains a serious loss, the educational world will gain thru such research as well earned leisure and rest from routine work will enable Professor Woodward to do.
>
> 3. *Resolved,* That our warmest wishes for continued good health and long activity follow our friend in his retirement.
>
> 4. *Resolved,* That a certified copy of this report be presented to Professor Woodward.

We shall not now speak of the great service Dr. Woodward has rendered to education, not only in America but in every country where the manual training idea has become an active force. This would be too large a task. Moreover, Dr. Woodward's relation to manual training is already well known to our readers. We believe, however, that most manual training teachers do not realize that the promotion of manual training is only one of many good things Dr. Woodward has done for education and human progress. We all know him as director of the first manual training school; we have heard of his work as president of the St. Louis Board of Education; perhaps a few of us have known him as an active force in other educational enterprises; but very few of us know of his service to science and engineering and the personal influence he has exerted on the students who have come under his care thru his forty-five years of teaching. On this account, as representing a less known side of his work we quote a few paragraphs from an article in the *Washington University Chronicle* for April:

> Calvin Milton Woodward was born in Fitchburg, Mass., on August 25, 1837. He graduated from Harvard in 1860, with the degree of A. B. In 1883 Washington University conferred upon him the degree of Ph. D., and in 1905, the degree of LL. D. In 1908 the University of Wisconsin also honored him with the degree of LL. D. Upon his graduation from Harvard, that University awarded him membership in Phi Beta Kappa; and the Tau Beta Pi Chapter of the University of Illinois later made him a member of that honorary society. . . . .
>
> In September, 1865, he came to Washington University as Vice-Principal of the Academic Department, and in addition to filling this office he did some

work in mathematics in the College. In 1866, Chancellor Chauvenet taught the higher mathematics and Mr. Woodward had charge of the Freshman branches in that subject. Shortly after this, Chancellor Chauvenet was unable to continue his duties, and Mr. Woodward added to his list of subjects taught, Descriptive Geometry, Astronomy, Trigonometry, Surveying and Drawing.

In 1866 he was made Principal of the O'Fallon Polytechnic Institute, and conducted evening classes in the old building on the corner of Seventh and Chestnut streets, on the site now occupied by the Lincoln Trust Building. In 1867 his title was Instructor in Mathematics and Assistant Principal of the Academic Department. In 1868, under the authority of the Corporation, he bebegan the organization of an engineering department, at Seventeenth street and Washington avenue in the University building, to which a wing was added for the accommodation of the new schoool. In 1869 he was made Professor of Descriptive Geometry and Topographical Drawing, and in 1870 he was advanced to the position of Thayer Professor of Mathematics and Applied Mechanics and Dean of the Polytechnic Faculty, which began operations in 1871. In 1880 the Manual Training School was opened, with Dean Woodward, its organizer, as Director. Immediately it became the educational novelty of St. Louis, and for that matter of America. . . . . .

It was fortunate for Mr. Eads and for the engineering fraternity as a whole, that from the bold inception to the triumphant completion of the St. Louis bridge, when, as Helen Hunt Jackson says, "The gods and the fairies wrot together to span the Father of Waters," Dr. Woodward, then an enthusiastic young professor in his thirties, watched every operation and knew the great work to the minutest details. He went to the bottom of those massive piers, where men under more than four atmospheres of pressure were shoveling aside the shifting sands on their way to the solid rock. He was among the first to walk the plank, high in the air, that made a footbridge connecting the approaching ends of the mighty middle arch. He knew the designs, drawings, contracts, and unusual tests of material. With some of his students, he was a passenger on one of the fourteen locomotives that tried the bridge in the presence of the largest crowd that ever assembled on the banks of the Mississippi. When the wonderful work was done which to this day stands in a class by itself, Captain Eads sent for Professor Woodward and said to him, "You must write the history of this bridge. You know all its troubles and all its problems and are the only man that can do it." The writing of this history occupied two busy years, and the work remains an enduring monument to its author and to James B. Eads, as well as a valuable contribution to engineering.

Professor Woodward's determining influence in shaping the higher educational policy of Missouri should also be recalled. From 1892 to 1897 he was a member of the Board of Curators of the University of Missouri and for the last four years of his connection with the Board he was its president. During that period occurred the great fire, when it was proposed to leave the Agricultural School at Columbia and to move the other colleges to Sedalia or Independence. He fought in the legislature against this dismemberment and was largely instrumental in retaining the University at Columbia in its present consolidated form. Tho an avowed Republican, he was made president of a Democratic Board of Curators, and was thus, at a critical time, a prime factor in freeing the University of Missouri from partisan control.

In 1906, the Secretary of the Smithsonian Institution died prematurely, as it was believed, thru extreme mortification at the reception accorded, by his scientific rivals and former friends, to his alleged unsuccessful experiments in aeroplanes. As a distinguished scientist of England demonstrated to his own satisfaction that steam power could never be used in ocean navigation, so, several years ago, the scientific critics reached the conclusion that the navigation of the air was an absurdity no longer worthy the attention of orthodox professional men. In the face of this feeling, Dr. Woodward presented, in Chicago, a paper upon the laws of air propellers, to the engineering section of the American Association for the Advancement of Science. The young and would-be progressive engineers were conspicuous by their absence; but a few gathered to hear from a hard-headed veteran a serious and successful treatment of the subject, which after events proved to be one of the most timely and important contributions at that gathering. . . . .

The story of a long life of cheerful labor and distinguished service in college halls can never be told. There is no tangible record of the daily lessons enforced with an unfailing and overflowing spirit of optimism. But it is this work and this spirit that produce a sure and lasting effect upon the lives of students. Just as the gentle sunshine is the most potent force in nature, so the efficient teacher, who is on the whole an object of condescending sympathy in our social state, is nevertheless the mightiest agent in the progress and development of society. It is he who transforms and transmutes the human mind. It comes to him the crude, rough, useless metal; he molds it, shapes it, tempers it, sharpens it, until it becomes the keen, elastic, trenchant blade of defense and offence. He is fashioning the coming leaders of society, therefore more than any other agency he is shaping the destiny of society. Happy is that teacher who knows his power and lives true to his high calling. His name may soon be forgotten, but the essence of his life and labor passes on from heart to heart and from generation to generation. Such a rare teacher and such a beneficent power we all know Dr. Woodward to be. His students will, for many years to come, rise up and call him blessed. In their children's childen he will abide, a formative force for truth and righteousness. Like that of every great and faithful teacher, true to a life of light and progress, his completed history can never be known until the race of mankind shall pass and "the leaves of the judgment book unfold."

ASSOCIATIONS

NATIONAL EDUCATION ASSOCIATION.

The Department of Superintendence of the National Education Association met in Indianapolis during the first week in March. The attendance was the largest on record, about 1600. The president of the Department, Superintendent Stratton D. Brooks of Boston, deserves credit for preparing an excellent program. Tho manual training and industrial education did not appear very large on the printed list of topics, they received their fair share of attention from the speakers.

Two of the papers of special interest to workers in the manual arts were those presented by Professor Walter Sargent of the University of Chicago and Supervisor Ben W. Johnson of Seattle. Mr. Sargent's theme was "Art as a Necessary Factor in Industrial Education." First he pointed out that if industrial education is to be of the greatest possible service is must include instruction in art. Merely to increase the output of industry without improving its quality is not a worthy motive in education; and raising the standard of quality involves art. A recognition of the commercial value of artistic quality in industrial products, then, is of fundamental importance in discussing problems of industrial education. Mr. Sargent emphasized the value of skill in freehand drawing and then showed that art as a factor in industrial education should include (a) a study of the evolution of design in particular crafts, and (b) a practical working knowledge of the principles of design. The speaker said that a product is artistically excellent when it satisfies the esthetic sense and the satisfaction of this sense is based upon utility and beauty. "No amount of decoration or ornamental treatment of expenive material can compensate for lack of utility. Closely allied to this is the satisfaction of fine craftsmanship. Delight in a piece of work excellently made is an esthetic satisfaction." Concerning beauty the speaker said:

"Any training in good design must consider the possibility of beauty in the essential parts of the object before any decoration is added. One element in delight in constructed objects lies in consistently related, well chosen proportions, and in refinement of outline. The chief beauty in the appearance of a house, for example, consists in the proportions and in the spacing of walls, windows and doors. No amount of ornament can compensate for mistakes in the disposition of these necessary elements."

In closing Mr. Sargent said, "It is hard to overestimate the probable influence of a knowledge of art upon American industries. The coming of good design into our industries tends to retain and to distribute in this country the large sums now sent abroad for designs and designers. It is the function of an industrial nation to convert its raw material into its most perfect and valuable form at the hands of its own workmen, thereby raising the quality of the industry and increasing the interest of the workman in his work. Art instruction at present is somewhat disorganized and seldom applied in the most effective way to industrial advancement. There is need of an industrial art school which shall take one American industry after another and explore it for artistic possibilities, which shall take the products and compare them with the best that have been produced in the past, and with the finest examples from other countries, and which shall discuss them to see how they may be made more useful and more beautiful."

Mr. Johnson's topic was "Children Differ in Vocational Aim." After referring to several examples of the changed point of view that has arisen in the manual arts during the past few years he said, "First, in answer to the criticism that the manual arts have failed to help the working man. It is not the province of the elementary school to teach vocations as such, and again, the children who later make up the so-called working class, are even now directly unaffected by any manual training, for they leave school too early. Second, some believe that manual arts have no value other than as a means for teaching applied design, or of affording a means of expression for the other subjects of the curriculum. While this may be true of some manual arts courses that have been emasculated by the academician, the critic ignores the real elements of the manual arts and that they too are being socialized. And lastly, industrial education for the elementary period, now believed to be a necessity, can be realized more quickly by using the manual arts we now have, modified to meet the situation. What to do is clear. First, establish manual training, manual arts or industrial courses—whatever name suits the need—in all our elementary schools. As Miss Langley wittingly remarks, "Manual training was first believed to be the panacea for all educational ills and has failed of expectations for the medicine was never given to the patient."

"My contention is that children do differ in vocational aim and that, therefore, industrial education must be a necessary part of the elementary curriculum. To realize this, the present elementary period should be divided after the sixth grade, and the seventh and eighth grades, together with the first and possibly the second year of the high school, become an intermediate school with elective courses, one of which would be an industrial course leading to a trade or vocational school or back to the high school or out to an apprenticeship and industry. The first six grades to be the elementary school proper in which the course would be the same for all pupils based on child growth and the demands of society, and should have as one of its elements industrial education, manual training evolutionized, as a means of relating the schools to industry and of making the child more sympathetic and intelligent in regard to the work of the world. And lastly, the first step forward is to modify existing manual training courses and continue to establish them until they are a part of every school curriculum."

—C. A. B.

NORTHERN INDIANA TEACHERS' ASSOCIATION.

The Art and Manual Training Section of the Northern Indiana Teachers' Association met in the high school building at Fort Wayne, April 8th. W. Scott Hiser of Richmond presided. Mrs. Mary D. Edson, supervisor of sewing in Fort Wayne was the first speaker, E. W. Boshart, supervisor of manual training in Fort Wayne was the second, and Professor Charles A. Bennett of Bradley Institute, Peoria, Illinois, was the third. Mr. Bennett's address was entitled, "Originality, the Bugaboo of the Manual Arts."

NORTH-CENTRAL ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS.

The fifteenth annual meeting was held in Chicago, at the Auditorium Hotel, Friday and Saturday, March 25, 26. A considerable part of the program dealt with topics of special interest to teachers of the manual arts.

President Calvin M. Woodward in his address considered some of the recent developments in the field of industrial education. The early attempts to meet the situation by employing teachers who were mechanics merely were shown to be inadequate. Trade schools at public expense were shown to be objectionable because of great cost. The third and latest solution was commended in the form of the "cooperative school," like those organized in Pittsburg and Fitchburg. This cooperation with the industries enables the school to do what it otherwise could not undertake because of the cost of shops and equipment.

Principal James F. Barker, Cleveland Technical High School, outlined a plan of organization for the vocational high school and by means of figures showing attendance contrasted its patronage with that of the "cosmopolitan" or general high school. In the discussion it was brought out that Toledo, which was one of the first cities in the country to adopt manual training, is planning to build a new general high school in the belief that this plan will pay in democracy thru the mingling of the different types of pupils.

President John E. Finley, College of the City of New York, spoke on "The Man and the Job," making a plea for education which shall fit the boy rather than an attempt to make the boy fit the education planned for him. Director George N. Carman described the cooperative plan now being worked out at Lewis Institute, Chicago. The youth of Chicago have not been so eager to avail themselves of this plan as was expected. At the end of the first year there were only fifty survivors, but in these cases the plan was considered to have been a great success.

The Association created a committee of five to consider the question of vocational training beginning in the sixth grade.

Among the recommendations of the Commission on Accredited Schools was one calling for a definition of units in Agriculture, in recognition of the growing introduction of this work in secondary schools.

Further, "recognizing the growing demand for instruction in subjects not strictly academic, such as music, industrial and manual training, fine arts, commercial subjects, agriculture, domestic science, etc., and that, owing to the demand for teachers far exceeding the supply, many schools giving work along these lines cannot secure college trained teachers and are obliged to accept teachers in some cases not up to the standard of culture of other secondary teachers, therefore colleges and universities are urged to turn their attention to preparing such teachers so as to put this work on a dignified basis." The Commission further recommended that college credit be given in these subjects and urged prompt action on the part of the colleges "to prevent the lamentable tendency to appoint non-college-graduates in secondary schools."

—LEONARD W. WAHLSTROM, Francis W. Parker School, Chicago.

MANUAL TRAINING ROUND TABLE.

The third semi-annual meeting of the Southwestern Ohio Manual Training Round Table was held at Miami University, Oxford, April 16th, 1910. Two sessions were held, one in the morning and one in the afternoon, and at noon a luncheon was served to members by the Domestic Science Department that was greatly enjoyed.

About sixty manual training teachers from Cincinnati, Dayton, Hamilton, and the surrounding territory were in attendance. Much interest was manifested in the work of both sessions and the discussions were spirited and to the point. Some of the topics discussed were: Should work be sent home as soon as finished?; Method of marking work for identification; What constitutes a day's work for a manual training teacher?; Does it pay to attempt the inking of drawings in the 8th grade?; Shall the industrial problems of the community become a problem of the school?; A state course of study sufficiently flexible to meet local needs; Does the careful training a boy gets in the manual training shop make him a dawdler in doing common work with tools?; Shall blueprints be used in the grades?

A special committee, consisting of P. A. Johnston, Cincinnati; F. C. Whitcomb, Oxford, and E. S. Steenrod, Dayton, was appointed to collect information regarding what other states are doing in the way of State Courses of Study in the manual arts and to make recommendations at the next meeting.

The next meeting of the Round Table will be held in Cincinnati in the fall, the date to be determined by the executive committee.

Officers for the ensuing year were elected, as follows: President, Frank H. Ball, Cincinnati; Secretary-Treasurer, Elmer Christy, Cincinnati; Executive Committee, F. C. Whitcomb, Oxford, Chairman; Bert High, Dayton; O. P. Kimmel, Eaton. —FRED C. WHITCOMB, Miami University, Oxford, Ohio.

MANITOBA.

During the past six months the Manitoba Manual Training Teachers' Association has held several important sessions. The papers and addresses delivered were as follows: Imitation, W. H. Pratt; Industrial Education, R. B. Vaughan; Furniture Design, S. T. Newton; The Use and Abuse of Blueprints, C. L. Fultz; The Aims of Various Systems of Manual Training, W. J. Warters; The Attitude of Trades Unions Toward Industrial Education, W. H. Bartlett, President Trades and Labor Council, and Alderman Shore; Vocational Education, W. W. Pierce; What a Boy Should Know at the End of Each Year from a Manual Training Standpoint, C. L. Fultz; Misdirected Energy in the Public Schools, S. T. Newton; Moral Value of Manual Training, A. Beach.

—S. T. NEWTON, Secretary, Winnepeg, Canada.

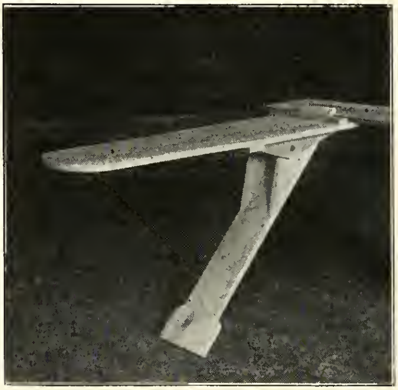
SHOP PROBLEMS

GEORGE A. SEATON, Editor.

COSTUMER.

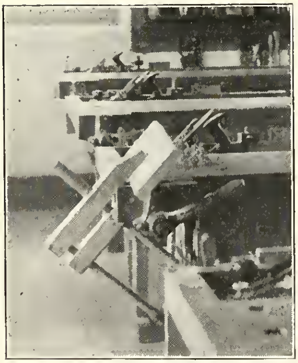
Dee K. Hiett of Kane, Pennsylvania, has submitted the drawing of a costumer or hall tree a bit out of the usual in its construction. The thinness of the material and the slight curve of the main pieces afford a grace and lightness that are not to be felt in some costumers. In the selection of the side strips, care should be used to take such stock as will bend uniformly.

IRONING-BOARD.



The photograph of the ironing-board explains more clearly than words the way in which this unique problem is to be used. It is arranged to be clamped upon the edge of the customary kitchen table when it is in use, and when it is put away it may be folded together. In its construction the most difficult point will be in placing the triangular brackets just right, so that the board will clamp upon the table where it is to be used. Some experimenting will be needed to determine just the best point for these brackets. The design was worked out by students of the State Normal University, Normal, Illinois.

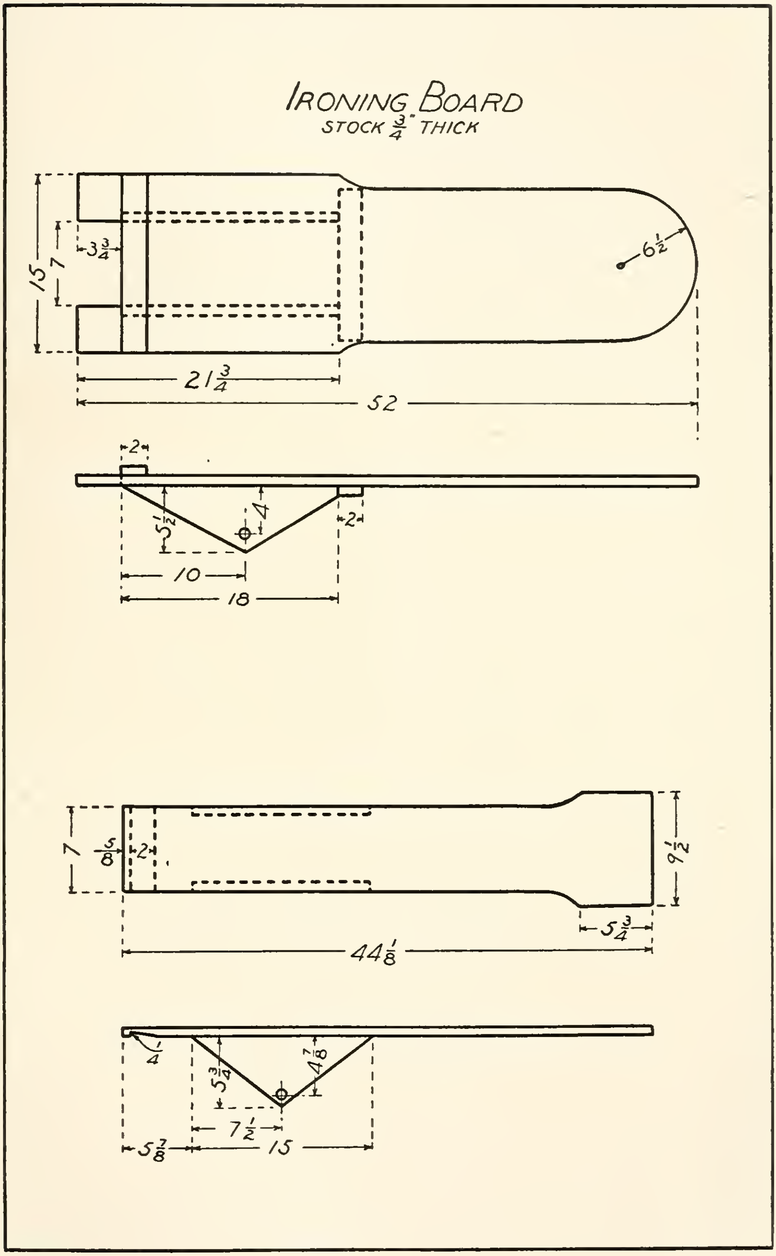
HANDSCREWS FOR CHAMFERS.



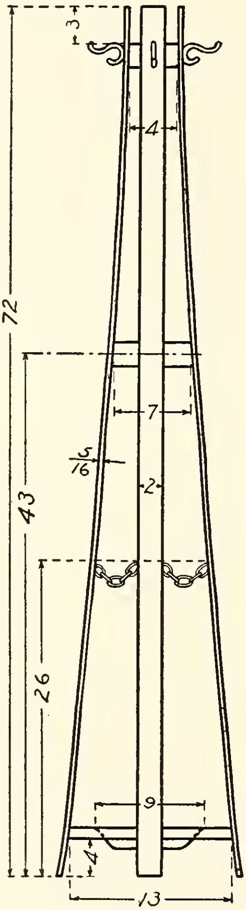
The possibilities of the handscrew are well worth a study. The varied uses to which it can be put will surprise those who have not given the matter much thought. In planing some chamfers it is often difficult to find a way of holding the piece of wood so the sole of the plane can be kept horizontal. The photograph shows how the handscrew helps out.

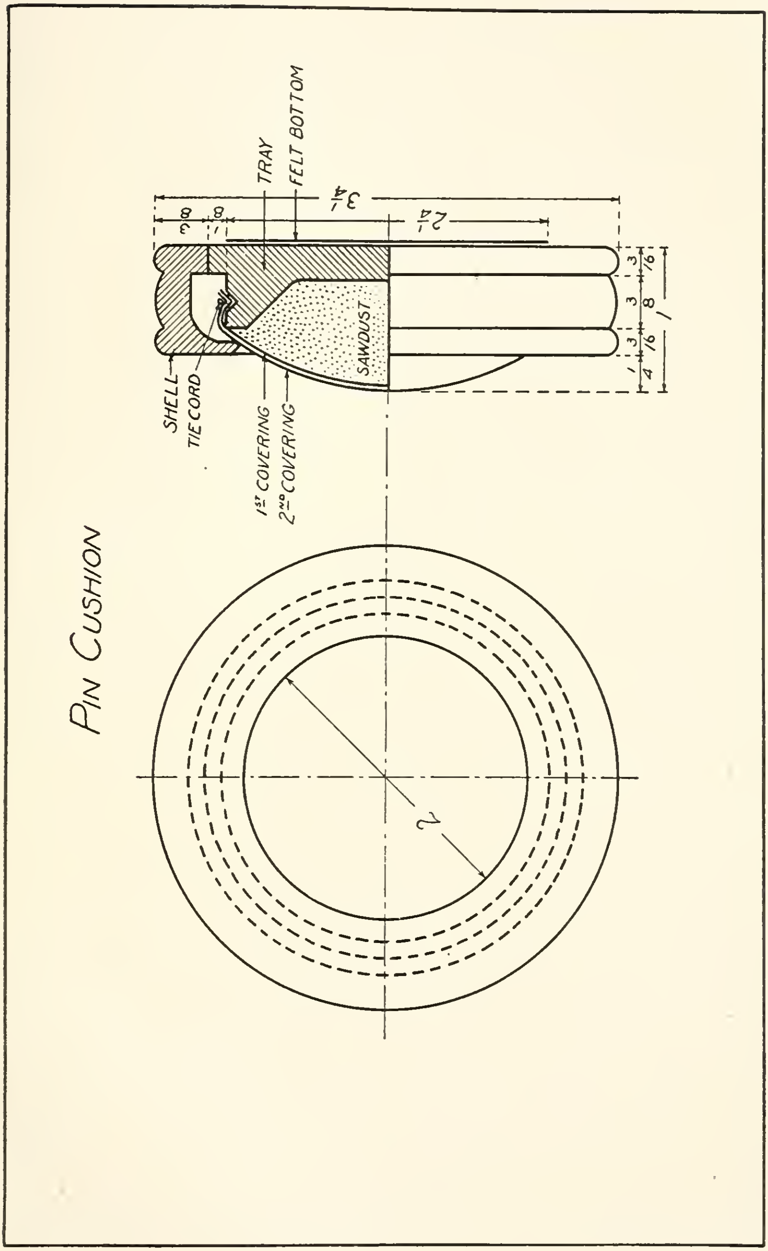
PIN CUSHION.

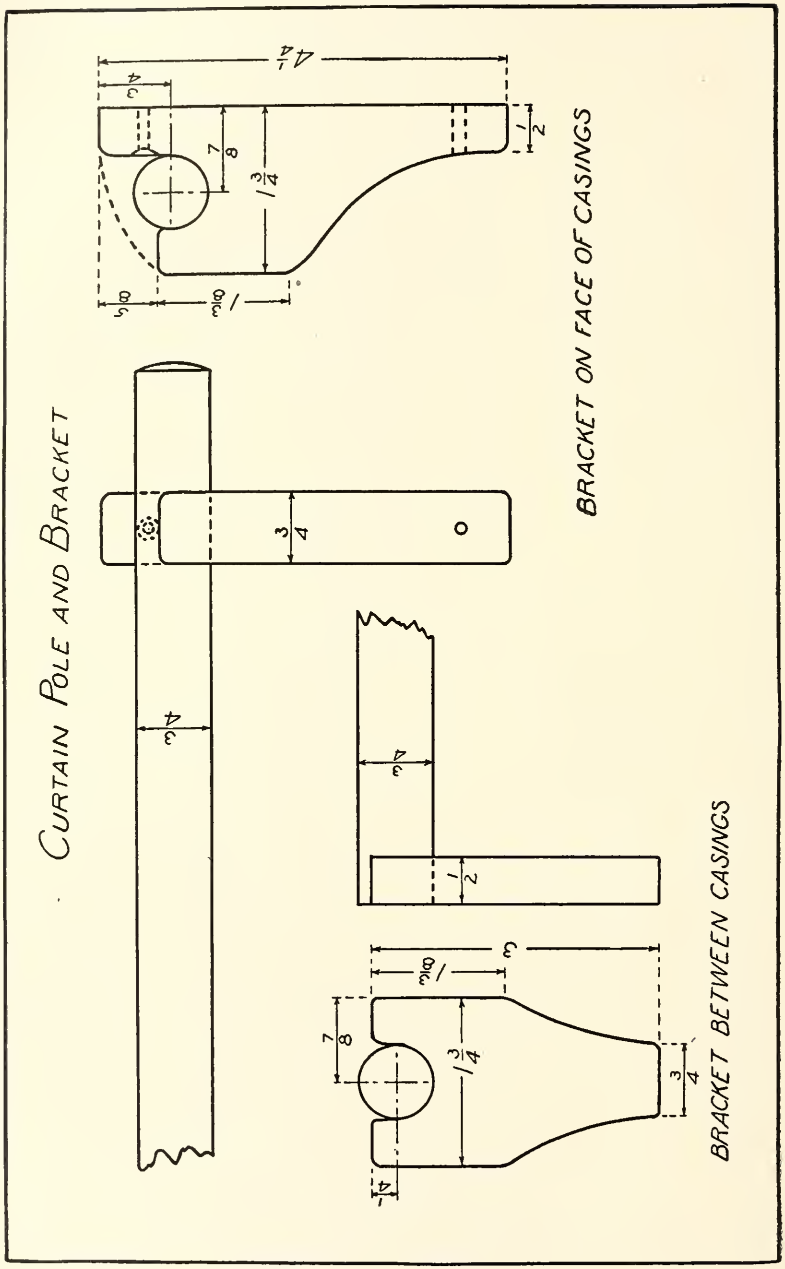
E. E. Ilgenfritz of the Central Manual Training School, Cleveland, has his students work out the design for a pin cushion somewhat along the lines of the enclosed drawing which is by one his pupils, Norville Mook. It forms a problem worked out, for the most part, with material easily available in the shop.


IRONING BOARD
STOCK 3/4" THICK
15
7
3 3/4
6 1/2
21 3/4
52
2
5 1/2
4
2
10
18
7
5/8
2
9 1/2
5 3/4
44 1/8
1/4
5 3/4
4 7/8
7 1/2
5 7/8
15

COSTUMER


3
4
72
7
5/16
2
43
26
9
4
13


PIN CUSHION
TRAY
FELT BOTTOM
SHELL
TIE CORD
1st COVERING
2nd COVERING
SAWDUST
3 1/4
2 1/4
3/8
1/8
3/16
3/8
3/16
1/4
1
2


CURTAIN POLE AND BRACKET
BRACKET ON FACE OF CASINGS
BRACKET BETWEEN CASINGS
4 1/4
3/4
7/8
1 3/4
1/2
5/8
1 3/8
3/4
3/4
3/4
1/2
3
1 3/8
7/8
1 3/4
3/4
1/4

CURTAIN POLE AND BRACKET.

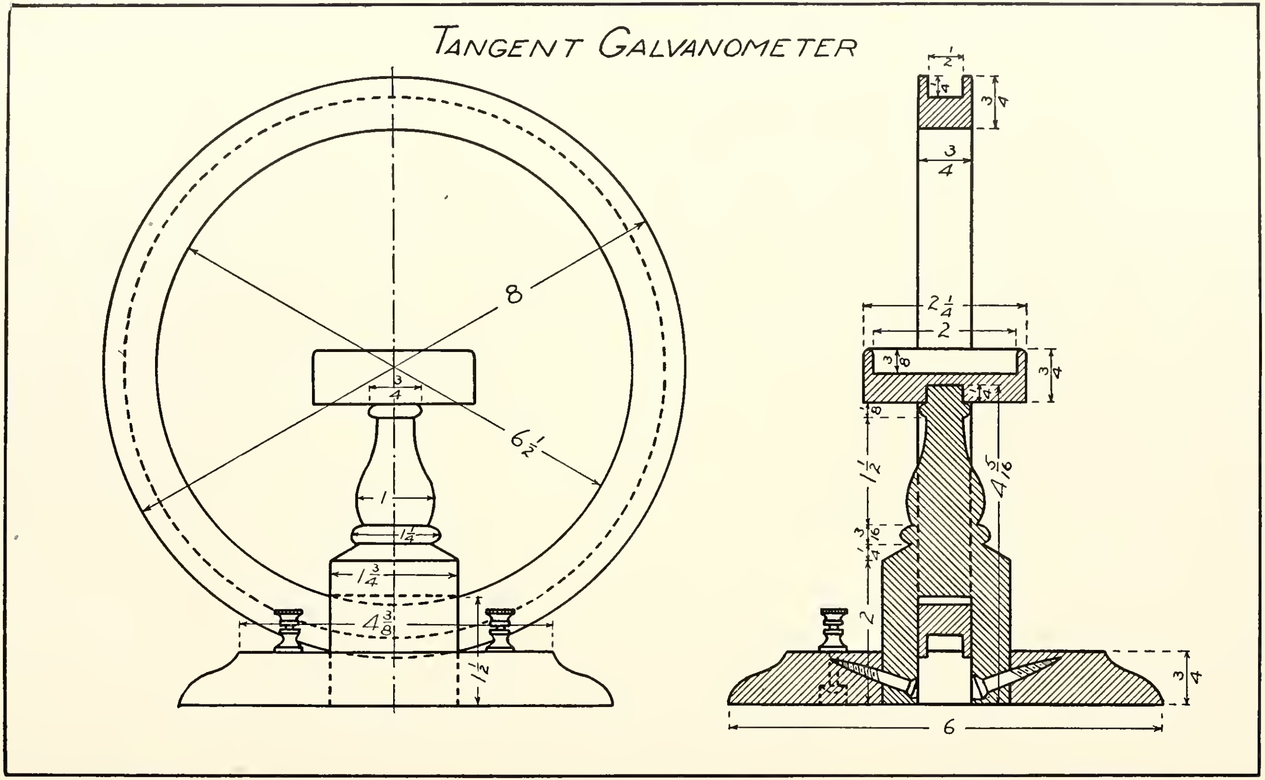
Aside from the towel-roller, there are few problems which offer a chance for planing a round rod. Yet this kind of planing is important enough to find a place somewhere in the experience of the manual training student and the curtain-pole and bracket of William E. Roberts of Cleveland will be welcomed for this reason. Forms of brackets are provided for placing upon the face of the casing or between the casings as the case may require.

TANGENT GALVANOMETER.

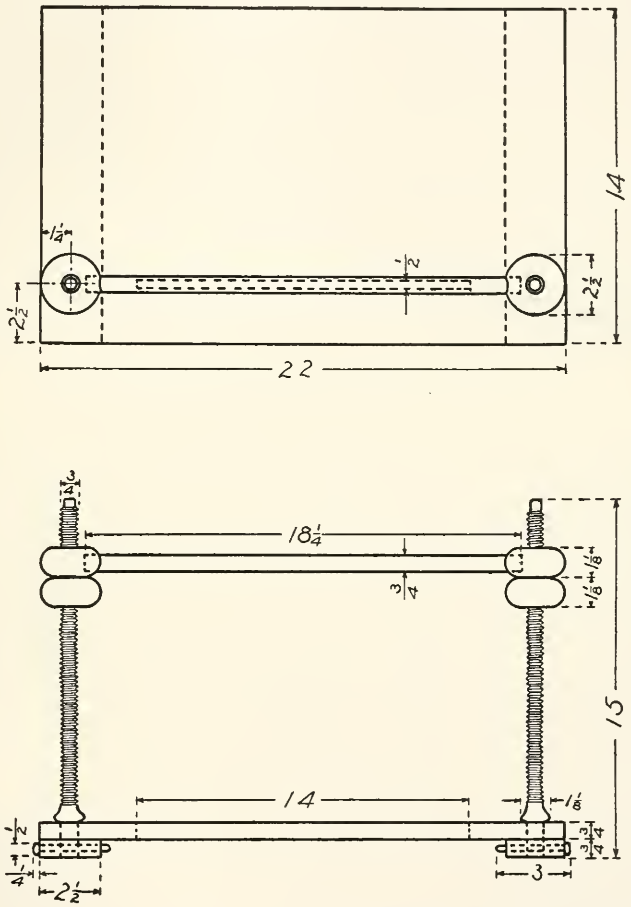
The tangent galvanometer forms a excellent problem in wood-turning, besides giving a chance for correlation with the work in physics and providing a model that will decidedly interest the average boy. The box shown in the drawing is planned to accommodate the regular galvanometer compass which is sold by dealers in physics supplies. Such a compass will have a short needle and a longer aluminum pointer placed at right angles to the needle and indicating the angle upon a circle graduated in degrees. A smaller or cheaper form of compass could be used, in which case the dimensions of the box may be altered to suit the compass procured. Care should be taken to keep the center of the compass needle at the center of the large ring. A short needle must be used in order that it shall not project too far beyond the field of magnetic action. The coil is wound in the groove before the ring is put in place. Ordinarily No. 20 magnet wire is used in the winding and the ends are carried in grooves in the base to the binding-posts. Additional binding-posts may be used and the coil tapped at different points so that the number of turns of wire in use may be varied, according to which of the posts are used. The current is proportional to the number of turns of wire and the tangent of the angle. After the coil has been wound, the ring holding it is placed in position and held there by the post. This post has a slot cut in it to fit the ring, and the lower end of the post is held in place by two brass screws entering the base.

SEWING-FRAME.

An excellent problem in combined benchwork and turning is that of a sewing-frame for bookbinding. The base is best glued up and cleated somewhat after the manner of a drawing-board. The vertical screws run thru holes passing thru the base and the cleats and are held in place by small pins inserted at the side. This allows the frame to be taken apart and stored in a small space. The cross rod is bored to fit fairly loose over the screws and is raised and lowered by the circular nuts just beneath it. The screws are threaded by means of a screw-box. In case this is not available and it is still desired to construct the model, a large handscrew may be purchased and the threaded rods upon it utilized. Sections cut from the jaw of the handscrew will serve as nuts. Where it is desired to introduce the work of bookbinding in the schools, this part of the equipment can be secured at very little expense by enlisting the service of the woodworking classes. Modifications in the size of the frame may be made to suit different requirements.


TANGENT GALVANOMETER
8
6 1/2
3/4
1
1 1/4
1 3/4
4 3/8
1 1/2
1/2
1/4
3/4
3/4
2 1/4
2
3/8
3/4
1/4
1/8
1 1/2
3/16
1/4
4 5/16
2
3/4
6

SEWING FRAME


1¼
½
2½
2½
14
22
¾
18¼
¾
⅛
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15
14
1⅛
½
¼
2½
3
¾
¾

MODEL OF GREEK THEATRE. MADE BY BOYS OF 5TH GRADE, SPEYER SCHOOL, TEACHERS COLLEGE, NEW YORK.

CURRENT ITEMS

CLINTON S. VAN DEUSEN, Editor.

An event of importance to the wood-using industries of the country and to engineers is the completion of the Forest Products Laboratory at Madison, Wis. June 4th has been set as the date for the formal opening. The laboratory has been established to aid, thru experiments and demonstrations, the lessening of waste in the manufacture and use of wood. It is a cooperative undertaking between the United States Department of Agriculture and the University of Wisconsin. The state has erected for the purpose a new building at the university and will furnish also the light, heat and power. The Department of Agriculture has supplied the equipment and apparatus and will maintain a force of thirty-five or forty persons required to carry on the work. Thru this arrangement, the United States has secured perhaps the largest and best equipped wood testing laboratory in the world.

The laboratory will be prepared to make tests on the strength and other properties of wood, to investigate the processes of treating timber to prevent destruction by decay and other causes, to study the saving of wood refuse by distillation processes, to examine the fiber of various woods for paper and other purposes, and to determine the influence of the microscopic structure of wood on its characteristics and properties. Facilities are at hand, in fact, for almost any kind of test on wood that practical conditions may require.

Lumber manufacturing and wood-using industries are keenly interested in the work on account of its practical bearing on reducing waste of wood—to them a subject of vital concern. Already they have proposed many experiments and supplied much testing material, which is awaiting attention.

NORTH ATLANTIC STATES.

Harry Coles has been appointed instructor in printing at the Seneca Vocational School at Buffalo, N. Y., and an equipment costing about $500 has been furnished for the printing department. This school will be opened for vacation work. Three more vocational schools are being planned to be opened next fall. The city has purchased a two-story building for one in the Black Rock district. This will provide a school entirely separate from the grammar school, which it is expected will be of great advantage. The other two schools will be opened in connection with grammar school buildings. These schools are intended for boys, but something will be done for girls in the near future.

At the April meeting of the Women Teachers' Association of Buffalo the topic of the evening was Industrial Education, and a paper was presented on the subject which aroused a great deal of enthusiasm and interest. The paper was written by Willard G. Welker, principal of School No. 5.

BOSTON.

The following have been appointed assistant instructors in woodworking in the city schools: Mr. Landall at the Minot School, Neponset; Miss Bemis at the Prince School, Back Bay, and Miss McCabe for an additional room recently fitted up in the Oliver Wendell Holmes School, Dorchester Center. These three teachers are all graduates of the Sloyd Training School.

Miss Harriet F. Smith, formerly special teacher of drawing in the Wendell Phillips School, West End, has been appointed to the corps of assistants to the director of drawing and manual training.

An Out-Door Grammar School has been etablished in connection with the Oliver Wendell Holmes School, in the Refectory Building, Franklin Park, and in connection with this, there is a room fitted up for manual training. This is an innovation, and will be watched with much interest.

During the last year McKeesport, Pa., has spent $10,000 in equipping manual training and domestic science departments in her high school. This is the first work of this kind in the city, and is looked upon as the beginning of a new era. At a recent meeting of the Board of Education an additional sum of $10,000 was appropriated to carry on the work during the coming year and to provide at least three new centers in the grade schools. J. T. Hawthorne is supervisor of manual training and Miss Esther Howland, formerly of Cleveland, is supervisor of domestic science.

SOUTH CENTRAL STATES.

Houston, Texas, has been experimenting this winter in running the manual training department in the night schools. Two centers were opened for mechanical drawing and one for pattern-making. The experiment was such a success that it is planned to open all the centers next year. The city has just placed an order for some cabinet-making machinery for the high school. A planer, jointer, and hollow chisel mortiser, will be installed in addition to the circular-saw and band-saw now in use. These will be used by the first year high school classes, as pupils in the Houston schools are now coming to high school having had four years of manual training in the grades.

NORTH CENTRAL STATES.

It is expected that the new high school on the east side of the river at Grand Rapids, Mich., will be opened this fall and the large addition to the high school on the west side will probably be ready for occupancy by the middle of next year. These buildings will provide good accommodations for manual training work, which will be considerably extended in the day schools, and will also be open for evening school work.

The manual training department of the city school at Joliet, Ill., in two years has grown from a one-room shop to six rooms and equipment for sheet-metal work and turning has been added to the original equipment for bench-work in wood. Pottery and printing will also be provided for soon. The seventh grade classes are given a half-day period on alternate weeks, and the eighth grade classes a half-day period every week. Approximately fifteen hundred boys have the use of the shops every month, including those who repeat. L. Day Perry is in charge of the work.

A kite flying contest was held at Belvidere, Ill., on May 13th. It was open to any pupil in the schools of Boone County, with a kite of his own make. The contest was under the direction of Will J. Craig, director of manual training at Belvidere, and has stimulated great interest in kite flying in that vicinity. Mr. Craig has for some years interested his pupils in kite-flying and has a unique and durable form of box kite that is very popular.

Davenport, Iowa, is planning on making a beginning in metalwork for the high school next year and if plans now under discussion are carried out the work will be started with a unique equipment. Gas fired metal furnace, gas heated core-oven and double gas fired forges are being considered.

Owing to the opening of several new technical high schools in Chicago, there is a demand for teachers in the following departments: Blacksmithing, foundry, machine shop, woodworking, electrical construction, and mechanical drawing. Minimum requirements: The equivalent of a high school education, and three years of special training. Teachers of manual training are also needed in the elementary schools. The examinations will be held in Chicago, June 27, 28, 1910. Information may be had from the Examiner, 829 Tribune Building, Chicago.

OHIO.

The citizens of Middletown have voted favorably on the issuing of bonds for the erection of a large and modern building for manual training and domestic science. The construction of the building will begin at once.

The demand from different parts of the country for information concerning the new continuation school in Cincinnati has led Mr Ball, the supervisor of manual training, to prepare an illustrated lecture which he is giving in several eastern cities this spring.

The new Woodward High School at Cincinnati is nearing completion. Accommodations for drawing, manual training, domestic science and art are provided. The best and most modern equipment is being installed.

Recently a disastrous fire damaged to the extent of about $7,000 the manual training rooms and equipment of the high school at Hamilton. The work of the school was greatly handicapped for the rest of the year, altho the authorities at once began repairs and the purchasing of new equipment.

An event of much interest to those educators in the state who believe that manual training and agriculture should have a prominent place in the education of boys and girls in rural communities, is the decision of the citizens of Trenton and Madison townships, Butler county, to erect a modern high school building which is to provide rooms for manual training, domestic science and elementary agriculture. This building, which is to cost $20,000, will be ready for occupancy by the middle of October. This is the first rural community in Butler county and one of the first in the state to provide for the education of her boys and girls along lines in which their environment and the direct interests of the community are considered.

WESTERN STATES.

Manual training work in Seattle, Wash., under the supervision of B. W. Johnson, is making rapid and substantial progress. Mr. Johnson, who began the work single-handed, now has a corps of forty-three teachers, twenty-seven in the high schools and sixteen in the grades.

The Board of Education has appropriated $90,000 to build an addition to the Broadway High School. This addition is to contain an assembly hall, gymnasium, and forge, foundry and machine shops. A complete polytechnic course is to be offered for both boys and girls. In each of the grammar schools one large room is being set aside for manual training work. This room is equipped with a combination bench, designed by Mr. Johnson, which is used for the boys' bench work and the girls' cooking classes. The scheme is working well as it does away with the sending of pupils to centers and is not so expensive as to be objectionable.

A new high school was opened this year which cost more than $300,000. Nine rooms in this building have been set aside for manual training work. For the girls a course covering the full four years is given. A kiln for firing pottery is included in the equipment for the girls' work. After the first two years all boys who wish to continue the course are to be transferred to the Broadway High School, so that school has been equipped with this transfer in view. The first year shop is equipped with twenty-four benches and a power grindstone. The second year shop with twenty benches, twenty lathes, a grindstone and an emery grinder. A band-saw and a bench-saw have been placed in the stock room.

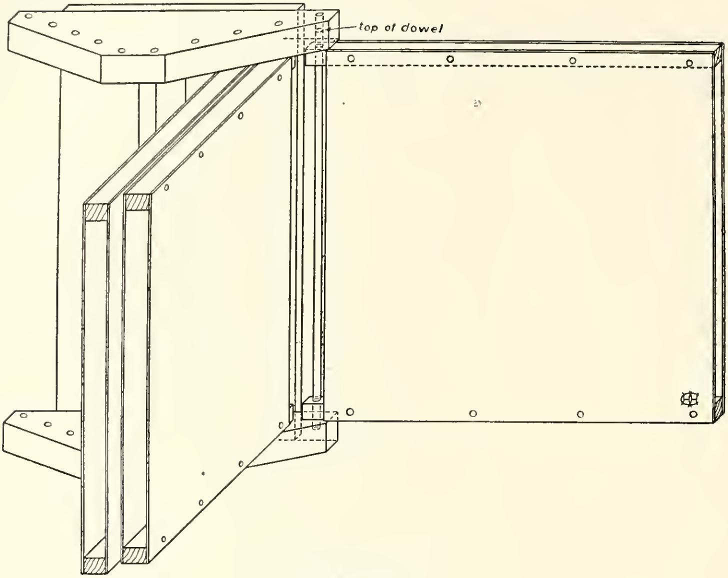
Aberdeen, Wash., has under course of construction a new high school which is to cost $125,000. W. F. Greenleaf, the director of manual arts, has been acting in the capacity of superintendent of construction of this building. A liberal amount of space in the building is being set aside for manual training work. Two large rooms are to be used in the boys' work, one for first year benchwork and the other for wood-turning and pattern-making. This room is to be equipped with lathes, a band-saw, combination bench-saw and jointer. A room is being equipped for domestic science and one for domestic art. In addition to this there will be drawing rooms for boys and art and design rooms for the girls. Forge and machine tool work is to be put in by the opening of school work in 1911.

In the grade schools of Spokane, Wash., three years of benchwork are given to the boys, and three years sewing and freehand drawing are given to the girls. In the high school four periods during the first year are devoted to benchwork and six to mechanical and freehand drawing. During the second year six hours for the first half-year are set apart for lathe work and in the second half-year the same amount of time is used for cabinet work; four hours during this entire year are also devoted to drawing. After the second year, shopwork is discontinued, but the boys may elect ten periods of architectural drawing for the third year and ten periods of machine design for the fourth year. There is also provided a four year course for the girls with domestic science and domestic art given in alternate years. Claude H. Cross has charge of the department of manual art for the boys.

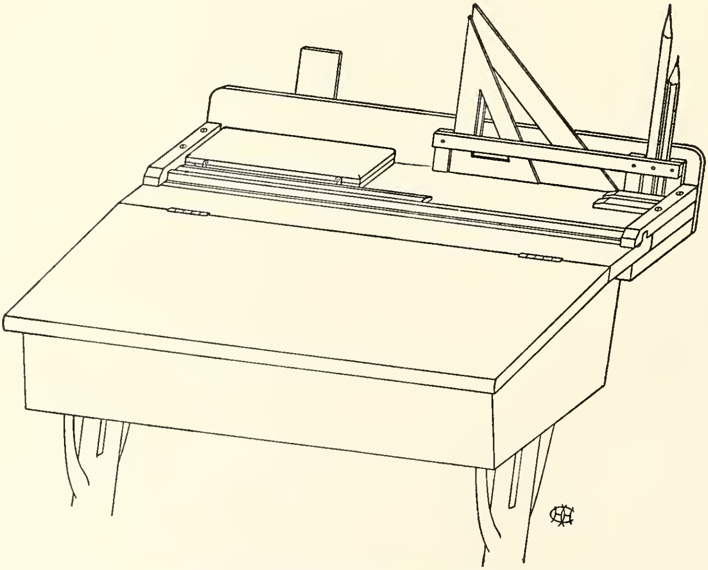
Work in manual arts was begun in Everett, Wash., two years ago last September with two bench centers and one cooking center. Mr. Hoag and Miss Stowell caring for all the work. The department now has nine faculty members and it will be necessary to add two more next year. In the beginning, benchwork and cooking were offered to the first year high school students and benchwork and sewing to the boys and girls of the eighth grade. There are now three grade centers where benchwork is done by the boys of the sixth, seventh, and eighth grades; two cooking centers for the girls of the eighth grade, and one sewing center where cutting and fitting is done by the girls of the seventh grade, sewing being given in the sixth grade thru the grade teachers. In the new high school building, five large, light rooms have been given to the manual arts. The cooking room has equipment for twenty-four on the group plan, with large pantry and dining room conveniently located. The sewing room has also been equipped for twenty-four pupils. The bench room has twenty-one five-foot single benches. This room is also equipped with power grindstone and emery grinder. The lathe room has twenty-four small lathes and one sixteen-inch pattern-maker's lathe. The stock room is provided with one twenty-four inch surfacer, one twelve-inch jointer, one combination bench-saw, and a band-saw. The mechanical drawing room with twenty-four drawing tables, instrument cabinets, and board racks has been equipped by the boys from the shops. This year, the boys in the manual training work have made and have under construction about $1,500 worth of cabinet work, most of which is to be used in the schools. So far, manual arts work is offered in only the first two years of the high school, but it is expected to add third and fourth year work in the near future. Manual arts work has been begun in the primary grades. Another year will see the connection made between this primary work and the work of the sixth grade. The grades are now enthusiastic over a kite tournament which has been undertaken thru this department.

H. G. Singer when engaged last August to take charge of the manual training work at Port Angeles, Wash., had ahead of him only a two thousand mile journey and a piece of ground with which to start the work. There is now a building thirty feet by fifty feet. The lower floor is divided into two rooms, one of which is occupied by the music and art departments and the other by the manual training department. The second floor is occupied by the superintendent's office and a supply room. The manual training work is given to boys from the fourth to the twelfth grades and sewing is given to girls from the fourth to the eighth grades by the regular grade teachers.

In Winnepeg, Canada, two manual training centers have been opened and G. Betts added to the manual training staff. Wood-carving, clay modeling, weaving and basketry have been put into almost all the remaining schools for grades one to four. Plans have been prepared for two twenty-two room manual training high schools. The manual training work in each will consist of the following departments: Mechanical drawing and machine design; freehand drawing; wood-turning, pattern-making, and foundry practice, forging; machine shop; electrical construction and domestic science.


top of dowel

BLUEPRINT FILE.



SCHOOL DESK ARRANGED FOR MECHANICAL DRAWING.

BLUEPRINT FILE.

In the usual manual training room it has been found difficult to care for blueprints. Boys seldom return them to their proper places and it is inconvenient for the teacher to do so after class. The "Blueprint File" shown in the accompanying illustration is designed to simplify the problem. The file consists of a series of vertical sections hinged, by means of dowels, between a horizontal base and top so that the sections may swing into such positions as will show their outside surfaces. On the front surface of each section a blueprint may be pasted as a sample of those within. The sides may, for simplicity and economy, be made of cardboard. The front or outer edge of each section is open for admitting the blueprints. Celluloid sides, as they would be transparent, would obviate pasting on the samples. In the illustration seven sections are removed for the sake of clearness.

If ten sections are not enough the back of the case could be extended and another series of sections built on top of the first. For this reason it will probably be found most convenient to bore the dowel holes completely thru the top as shown in the illustration. Each section may easily be made double with a sample on each side.

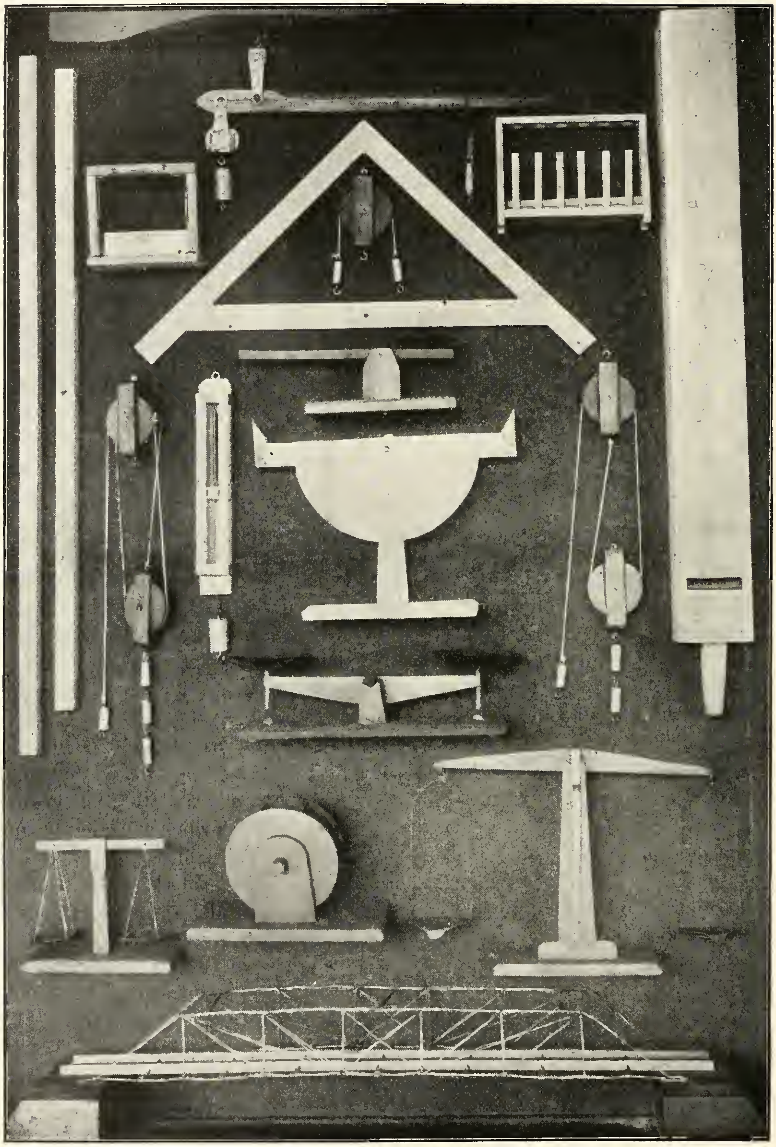
The whole, if constructed in this simple form, may be made by boys taking woodwork for the first year.

HOW THE ORDINARY SCHOOL DESK MAY BE USED FOR MECHANICAL DRAWING.

The simple device shown in the accompanying drawing was designed for economy's sake and has proved very convenient. It is a soft wood tray for holding mechanical drawing instruments attached to the ordinary school desk. As no screw or nail enters the desk the tray may be removed leaving the desk unmarred. Moreover, by this means, an ordinary recitation room may be used also for mechanical drawing classes.

The construction of the tray is so simple that it can readily be made by boys who have taken two years of woodwork. The size may be varied to suit the conditions. In our case the tray is five inches wide and the bottom is the same thickness as the top of the desk. The light pieces which hold the triangles are hard to make if they are too narrow. A width of ⅝ inch from ½ in. stock is satisfactory. Brads hold the T-square and sandpaper block which are hung one on the back. A brad, put between the two pencils, allows one to be removed without disturbing the other.

This arrangement has served us for two years so well that drawing tables will probably not be introduced. Howard H. Carroll,
Supervisor of Manual Training, Concord, N. H.



SCIENCE APPARATUS, MADE IN NEW YORK CITY PUBLIC SCHOOLS.

REVIEWS.

Manual Training for Common Schools. By Eldreth G. Allen, Instructor in Woodworking in the Manual Training High School, Indianapolis, Ind. Published by Charles Scribner's Sons, New York, 1910; pp. 217.

In his preface the author states that he "has attempted to be more thoro than complete. No attempt has been made to add anything new to the subject matter, but only to arrange well known facts so that they will offer as systematic and complete a course of study as is offered in any of the older organized courses."

Chapter I deals in a brief way with the plane and saw (kinds, uses, sharpening, etc.), and describes the methods of planing a piece of stock to dimensions. Chapter II takes up briefly the need of mechanical drawing as the language of the constructive arts and the construction of a lap joint with chisel, back-saw and bench-hook. Chapters III and IV take up the mortise-and-tenon joint in detail, and a briefer description of the more common joints, together with considerations of screws, nails, lag bolts, and some hints on gluing. Chapter V contains descriptions of the various tools, and manner of using, adjusting and sharpening. Chapter VI is a clear and well written statement on wood finishing, with some formulae for stains and fillers. The popular and much used wax finish is not considered as an especially desirable one; "the only really good thing is that it is easily applied." Chapter VII, in the brief space of four pages considers "Some Essentials of Constructive Design," and gives a list of standard dimensions for various articles of furniture.

The last chapter contains some suggestions for a course of study for the seventh and eighth grades and the high school. Among these suggestions are some models which are quite good, as the scales and looms; others as the knife-and-fork box and the windmill are of the conventional type. An appendix contains lists of tools and equipments.

The illustrations and photographs thruout the book are clear and numerous.

In the introduction, written by Fassett A. Cotton, President of State Normal School, La Crosse, Wis., some arguments for the introduction of manual training into the common schools are presented. "The book does not presuppose on the part of the teacher special training in the manual arts, but, on the contrary, brings to the untrained teacher the help of a specialist. . . ." "Given a teacher of average ability, and some appreciation of the new movement in education, and this book will quickly find its place." —L. W. WAHLSTROM,

Francis W. Parker School, Chicago.

Pattern-Making. By G. H. Willard, with chapters on Core-Making and Molding by F. D. Crawshaw. Popular Mechanics Company, Chicago, 1910; 5½x8 in.; pp. 214; illustrated; price, $1.00.

The book opens with a chapter on pattern-making as a trade and the education of the pattern-maker, showing how the successful pattern-maker must have a knowledge of mechanical drawing and drafting, molding, casting, properties of metals and woods, methods of finishing, etc. Then follows a chapter descriptive of the tools used in pattern-making, a chapter on woods used for patterns with a discussion of gluing, warping, judging and selecting lumber; a chapter on the various joints used in patterns; four chapters on turning with a description of the lathe and discussion of hand and machine turning; and four chapters on circular-saws and machine tools. Following these are twelve chapters each dealing with some special type of pattern work beginning with simple patterns and taking up successively crooked patterns, sweep work, pipe work, stove patterns, and molding machine work. In each case, the making of the mold from the pattern is discussed in connection with the making of the pattern, the emphasis being placed upon economy both in the foundry and in the pattern shop.

The book is clearly written, profusely illustrated with good drawings, printed from large clear type on good paper and fully indexed.

The chapters on core-making, molding, and the making of loam patterns by Mr. Crawshaw are a distinct addition to the volume.

The book is one that should prove of value to the mechanic and also a welcome addition to the literature on this subject for technical schools.

—CHARLES H. BAILEY,
Iowa State Teachers College, Cedar Falls, Iowa.

American Art Annual, 1909-1910. Edited by Florence N. Levy. Published by American Art Annual, 215 West 57th Street, New York, N. Y., 9x6 in.; pp. 284; price, $5.00. For the seventh time the American Art Annual gives us in compact and pleasing form a great mass of information on art matters. It contains a list of paintings sold during the past two years, and the art books published during that time. Then follows a directory of painters, sculptors, and illustrators, also a list of architects, and art dealers. It gives a chapter to obituaries and another to the recent tariff act so far as it relates to works of art. It is a valuable book of reference.

Handicraft. Published by The Dyke Mill, Montague, Mass. $1.00 a year. We are glad to welcome this magazine again after a cessation of six years. It appears in the same simple, dignified form, but this time it is supported by the National League of Handicraft Societies instead of by the Boston Society of Arts and Crafts. Frederic Allen Whiting of Boston is the editor and he is assisted by an advisory staff consisting of Lockwood De Forest of New York, Euphrosyne Langley of Chicago, Elizabeth Pitfield of Philadelphia, M. Emma Roberts of Minneapolis, and H. Langford Warren of Boston. The first number of the new volume began in April. The second is just at hand. This contains an article on "The Mark of the Tool" by Theodore C. Steele and one entitled "A Little Talk on Iron Work" by Frank L. Koralewsky. More than formerly the magazine contains current matter of special interest to craftsmen and to purchasers of craft work.

The following have been received:

Agriculture and Its Educational Needs. By Andrew S. Draper, Commissioner of Education, State of New York. Published by C. W. Bardeen, Syracuse, New York. 4¾x6¾ in.; pp. 92; price, 50 cents.

An address delivered before the State Educational Association at Syracuse in December, 1908.

Report of the Committee of Ten on the Relation of Industrial Training to the General System of Education in the United States. This is the report presented at the Milwaukee meeting of the National Society for the Promotion of Industrial Education.

Bulletin No. 10, National Society for the Promotion of Industrial Education. Proceedings of the third annual meeting held at Milwaukee, Wis. Contains addresses by Hon. James O. Davidson, Governor of Wisconsin, President Van Hise of the University of Wisconsin, Secretary George H. Martin of Massachusetts, President Humphreys of Stevens Institute, Arthur D. Dean of the New York State Education Department, Charles F. Perry of Milwaukee and many others.

The School of Industrial Arts, Trenton, N. J. Announcement for the year 1910-11.

Industrial Education and a State Policy. By Arthur D. Dean. Published by the New York State Educational Department, Albany. Address before the National Society for the Promotion of Industrial Education at the Milwaukee meeting.

Vocational Schools. By Arthur D. Dean, New York State Educational Department. Reprint from the annual report of the department.

Arbor and Bird Day. Issued by F. G. Blair, State Superintendent of Public Instruction, Illinois. This is a seventy-six page illustrated book. It contains an article on "School Grounds" by Supt. J. K. Stableton of Bloomington and several articles on trees and birds especially appropriate to a publication intended to arouse interest in the beauties of nature.

Cooking the Cheaper Cuts of Meat. By Charles Barnard. Bulletin No. 6, issued by the Housekeeping Experiment Station, Darien, Conn. Price, 10 cents.

Economy of the Round Dairy Barn. By Wilbur J. Frazer. Bulletin No. 143 of Agricultural Experiment Station, University of Illinois. Illustrated with many drawings and photographs.

Camera Work for Profit. By W. D. Browning. Published by The National Book Company, Cleveland, Ohio. Price, 25 cents. "A series of practical suggestions to the camera user who may profit greatly in a pleasant pastime."

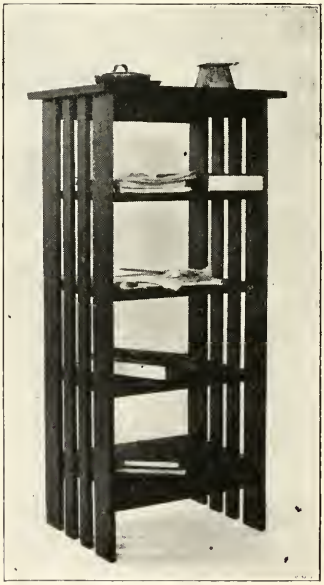
The David Ranken, Jr., School of Mechanical Trades. St. Louis, Missouri. A pamphlet giving the foundation deed, charter and by-laws of this new trade school.

Sloyd Bulletin. February, 1910. Published by the Sloyd School, Boston, Mass. Contains an article by Dr. C. Hanford Henderson entitled "What is Fundamental in Vocational Education?", also a short history of the Sloyd Training School, by Gustaf Larsson.

Announcement of Technical Education. This is the title of Teachers College Bulletin No. 6, just received. Published by Teachers College, Columbia University, New York City.

Report of the Director of Drawing and Manual Training, Boston, 1909. A report that is well worth keeping on file for reference. It is signed by Walter Sargent and Frank M. Leavitt.

Arbor Day Annual. Bulletin No. 467 of the New York State Education Department. This is a selected list of books on nature study for schools and libraries, by Elva L. Bascom.



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